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THE CULTIVATION

OF THE

PEACH AND THE PEAR,

ON THE

DELAWARE AND CHESAPEAKE PENINSULA.

WITH A CHAPTER ON QUINCE CULTURE AND THE CULTURE OF SOME OF THE NUT-BEARING TREES.

BY

JOHN J. BLACK, M. D.

WITH PLATES.

"Let there be thistles, there are grapes."

WILMINGTON, DEL.:
THE JAMES & WEBB PRINTING COMPANY.
1886.

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JOHN J. BLACK, M. D.

TWIGS OF A HEALTHY PEACH TREE.
(From U. S. Government Agricultural Report.)
PLATE I.

TWIGS OF A PEACH TREE HAVING THE YELLOWS.

(From U. S. Government Agricultural Report.)

PLATE II.

MYCELIUM AND OTHER FUNGOID FORMS FOUND ON THE LIBER OF A PEACH TREE HAVING THE YELLOWS.

(From U. S. Government Agricultural Report.)

PLATE III.

SPIRAL FUNGI, FOUND IN BARK OF A PEACH TREE WITH YELLOWS.

(From U. S. Government Agricultural Report.)

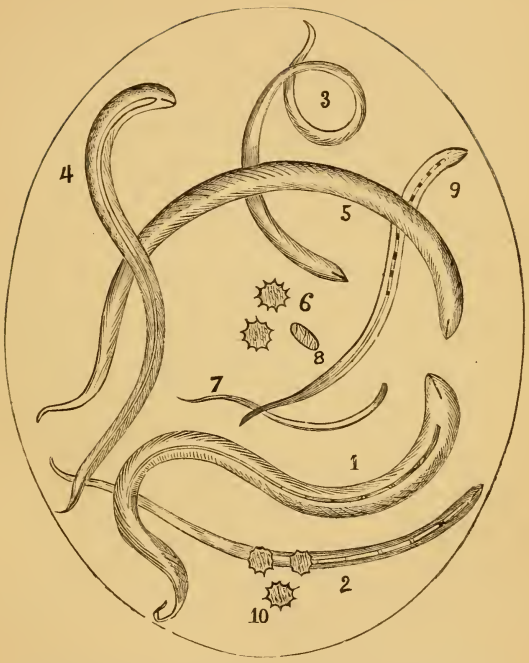
PLATE IV.

DISEASED PEAR.

Attacked by fungi and entozoa.

(From U. S. Government Agricultural Report.)

PLATE V.

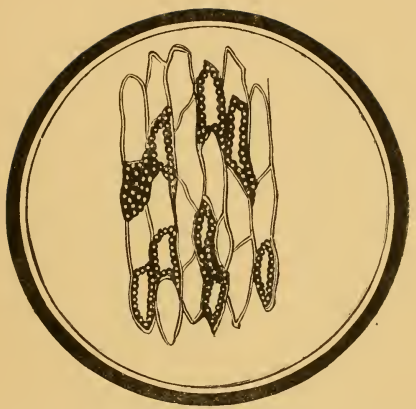


ENTOZOA FOUND IN A PEAR, AND KNOWN AS "ANGUILLULA."

This genus was formerly placed among the Infusoria, but is now arranged in the order Nematoidea.

(From U. S. Government Agricultural Report.)

PLATE VI.



CELLULAR STRUCTURE OF BARK OF BLIGHTED PEAR TREE, WITH SPORES.

(From U. S. Government Agricultural Report.)

PLATE VII.

SPORES ON A LEAF RIB OF A BLIGHTED PEAR TREE.

(From U. S. Government Agricultural Report.)

PLATE VIII.

PREFACE.

If any apology is necessary from me for having written this book, it is due to the veteran Fruit Growers of the Peninsula, who know much more than I about all that pertains to the business. Yet I feel that I am doing a work, that will, in many ways, benefit THEM—a work that will cause discussion, and tend to bring uppermost in their thoughts, matters which need constant agitation, in order to sift the chaff from the grain, and to check the inroads of ignorance and prejudice, which often creep over minds at rest.

For the novice I have no apology. For him I have written just such a book as I feel and know would have been of very great help and value to me when I first engaged in fruit culture, and the want of just such a guide, in my early struggles, has cost me much pecuniary loss, and many bitter disappointments.

In gathering material for the book, I have not hesitated to avail myself of the work of others, and when used directly, have always endeavored to give proper credit. My own opinions and judgments, where expressed, have been formed from close observation, from experiment, from personal experience, and from the knowledge gained in my intercourse with the intelligent growers of fruit wherever I have met them. All my ideas have been developed after due consideration, and I am prepared to maintain them until convinced that they are erroneous; then they shall be withdrawn or modified to suit a wider-gained experience. Any statistics I present are founded more or less on conjecture, and it will only be necessary to go into such work as I have been doing to see how utterly bereft the business of fruit culture is, of any fostering care of government, State or National.

The reader will please note that the work is not one adapted to all parts of the country, nor is it in every way a complete Manual of Horticulture; but it is intended to be just what its title declares--A Manual for the Cultivation of the Peach and the Pear on the Delaware and Chesapeake Peninsula, with a

chapter on the cultivation of the Quince, and some of the nut-bearing trees. I hope the advice it gives may be found useful in other parts, but all its methods are particularly adapted to the Peninsula; and for the benefit and instruction of the good people residing thereon, I have written it. Its preparation has cost me much work, and entirely absorbed as is my time, by the perplexing and harassing duties of an arduous and laborious profession, the opportunities for its unfolding have been snatched, as it were, from hours which should have been devoted to needed rest and recreation.

Nevertheless, some such Guide was needed; and the labor of getting it out has been in the nature of a pleasure as well as of a duty to me; and now, with the earnest hope that it may prove of some substantial benefit to the people of my native State, and of the whole Eastern Shores, and profoundly impressed as I am with its many shortcomings, I launch it forth, and I pray God that it may, IN FACT, bring forth good fruit, and be met by only balmy breezes on the gentle waves of a summer sea.

JOHN J. BLACK.

New Castle, Del., January 1, 1886.

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Chapter I.

The Peach is closely allied to the Cherry, the Plum, the Apricot and the Almond, and, according to Prof. George Thurber, although usually called *Amygdalus Persica* now comes under the genus *Prunus* and will hereafter be likely referred to as *Prunus Persica.* It originated in the East; Persia, or most probably China, and in this latter country has been cultivated for centuries. Darwin inclines to the view that the Peach is derived from the Almond, giving his reasons *pro* and *con*, and I think his conclusions are the ones generally accepted at the present time.

The tree on the peninsula reaches the height of from fifteen to twenty-five, or, even, thirty, feet, with corresponding ordinary diameter and circumference. The leaves have the leaf-stock, are lance-shaped and saw-toothed, and change in season from green to yellow or brown. Situated on the leaf-stalks, usually, we find, in many varieties, glands, some round or globe-shaped, and some kidney-shaped, and, again, some varieties glandless; these latter commonly having longer teeth to the leaves. The glands, probably, give

the peculiar odor to the leaf. The tree blossoms before the leaves appear, and usually the late peaches before the early ones, and this is one reason why the flower is so delicate, being naked at, and for some time subsequent to, its birth. The blossoms are like those of the rose, expanding from the separate buds, and their leaves are usually pink—darker or lighter in shade—although in some rare varieties they are white, or yellowish-white. In budded varieties the flowers vary, being in some very open and in some nearly closed, whilst in natural fruit they are fuily opened. The bark is of an olive brown color, when healthy, and only moderately thick, and becomes tinged with various shades of pink as the sap advances to the branches.

The Peach is a drupe or stone fruit. Some are free-stones, some cling-stones, and some neither the one nor the other, and, indeed, in some seasons, the free-stone-fruit does not easily leave the seed, as the canners and evaporators then find to their sorrow. The natural seed are smaller, as a rule, than the budded, more difficult to open, cavities smaller, are cleaner and closer grained, and in color are dark cream, or very light tan, whilst budded seed are more of a maroon color, and are in every way handsomer than the natural seed. The kernel of the natural seed is denser than the others, and seldom contains philopena, as the budded seed often does. The seed of weak or diseased trees is apt

often to separate on opening the peach and to be gluey and gummy.

Should large quantities of double-meated seed be found in a given quantity of budded seed it would rather tend to signify that the trees were on land too rich, and were being forced abnormally, and both the ovules had been fertilized and stimulated, whereas, in the peach, ordinarily, one ovule aborts and the other lives. Such overstimulated trees would naturally suffer from early decline from over gestation, unless abnormally fed, and this abnormal feeding might cause premature decline again—as we often see in high livers among mankind. The leaves and the kernels have a strong flavor and odor of prussic acid, and this is one of the peculiar essentials of the Peach. The color of the flesh of the Peach is either, as a rule, yellow or white, the latter often being called reds, from the color next the stone, and on the peninsula both are equally popular, sometimes the yellow and again the white gaining favor. The yellow varieties probably furnish the best specimens of the fruit, but at the present writing the white fruit is causing increased inquiry for all purposes. The varieties of the Peach run into the hundreds, but on the peninsula, probably twenty varieties will cover all that are at present usually planted. The natural tree has been known to exist on the peninsula for more than a hundred years, but as to the growing of the improved, or budded peach

tree, on this peninsula, the first orchard of which I can find any trace was planted by Isaac Reeves on his farm in the suburbs of Delaware City, now owned by his son Clement Reeves, Esq., of that town, who has kindly furnished me with information in regard to the Peach-culture of that date. This was in the year 1832, and about 1837 to 1840 Major Philip Reybold, a man who has left an indelible mark in his community as an active and progressive citizen, together with his sons, Philip Jr., John, William, Clayton, Barney and Anthony, went more or less extensively into the business, together with other prominent growers of that day, among them, Jno. C. Clark, Dr. Emerson of Philadelphia, Mr. Spearman on Duck Creek, Messrs. Atherlee and Fennimore, on Appoquinimink Creek, and Jehu Reed of Kent Co., Delaware ; all these had large orchards up to the time the land refused longer to grow the trees by the method of cultivation then used. My father, the late Dr. Charles H. Black, was a pioneer-grower in Kent Co., Md. Since 1850 the Peach has probably been generally grown in the Delaware City region. I learn from Mr. Clement Reeves that the trees were obtained from nurserymen or grown by the growers themselves ; that they endeavored to use natural seed even after budded stock came in ; that they manured the land with barn-yard manure, set out the trees, planted corn for three years, manuring the corn in the hill, and that this was all the

fertilizer the trees received in a life-time. The trees were ploughed and cultivated and pruned as required. Mr. Reeves planted land the second time in trees with the aforementioned treatment, but they died of yellows after having yielded one crop of fruit. After that he and others abandoned the cultivation of the peach. After the Peach failed in the Delaware City region, Messrs. Polk and Clark went to Kent County, Md., and planted orchards successfully, and to-day that county produces elegant fruit. So, by comparison, the Delaware soil gave out long before the Maryland soil. The soil about Delaware City is richer, or was then, and heavier than the Maryland soil. In those days the outlet for peaches was very limited and the growers of the then comparatively small quantity of fruit were often dismayed; whole steam-boat loads being frequently thrown into the water, both at Philadelphia and at New York, to relieve the overstocked market.

The world moves, and probably to-day, with the facilities at our hand, we can market successfully, more millions of baskets than our predecessors could market tens of thousands. Peach culture entered the peninsula cotemporaneously with the telegraph, and both have progressed with almost equal step to a point of which, probably, their originators never dreamed. The business was not active from 1850 to 1854, about which time that great developer of the peninsula, the Delaware Rail

Road, was beginning to penetrate its hitherto hidden fields. Now the intelligent and progressive men of the section saw the opportunity for development of the culture of the Peach, and from that time the business has increased and prospered, until to-day it is, probably, above all others, the great source of prosperity to the good people inhabiting the land between the two great bays of the Delaware and the Chesapeake.

The Peach crop appears to be running in cycles of years. In the "seventies" the business was poor, in the "sixties" it was better, and now, in the "eighties," it is flourishing grandly, the season of '80-'81 being the only general failure. Improved culture and methods may, of course, be the cause of all this.

The probable centre of the peninsular peach-belt at this time, under the present methods of culture, etc., is about Wyoming, in Kent county, Delaware, and extends north to Middletown, in New Castle County, and south to Laurel, in Sussex county, Delaware, and in breadth reaches from the Delaware bay to the Chesapeake. Fifteen years ago, or less, the centre was probably at Middletown ; so it will be seen that the belt is spreading southward quite rapidly. The great problem to solve is, if possible, to bring back the centre to Middletown by new methods of culture and other adjuncts. At the present time, in some parts of New Castle county, notably about Iron and Chestnut-hills,

the very finest fruit is raised, and the trees are flourishing, if the red-clay soil is chosen. There is much iron-ore and potash in this red soil, the land is often light and stony, and is not in a high state of cultivation. The Megget and orther orchards, in this neighborhood, are celebrated in the Wilmington market for their fine fruit.

There are at present on the peninsula probably between two and three millions of peach trees in bearing, and very nearly as many planted, but not yet in bearing, making in all, say, five millions of trees. The trees in the upper section are generally larger than those in the lower section, and by the large trees going out in the upper section, the present capacity of five millions of trees is not what it would be did the lower section trees grow to the size of those about Middletown, for instance. Thus the increase in the number of trees does not increase the fruit-yield as rapidly as one might, at first thought, think, and so the oft predicted glutted markets of the future may be avoided.

The past season (1885) there have probably been raised and marketed on the peninsula three millions of baskets of peaches. The prices realized have been very handsome, and the business has received a great impetus. Many outside influences have this year aided the peninsular growers, and chief, of course, because the crop was almost a failure in other sections of the

country, reaching even to the far West. There is danger that such a state of affairs may precipitate a condition of "bonanza-farming" in peach growing, the planting of an excessive acreage, followed by neglect of the details of the business, and disappointment to the unfortunate neophytes. Within ten years I have heard peach growing denounced as a delusion and a snare, have seen magnificent trees pulled out as unworthy of the soil they occupied, and now again see men who did this, plant orchards and talk as enthusiastically as the most enthusiastic, about the great delights and profits of peach culture.

Peach growing is like any other business, whatever, that a man may follow. It demands and must receive absolute attention to detail, from the very inception of the idea of becoming a grower, down to the hour the fruit is turned into money. Make the crop a legitimate crop, say one-fifth to one-sixth of your farm, and be careful when you plant, what you plant, and where you plant, and most important of all, attend to what you do plant, and this attention must vary with soil, location, and other surrounding circumstances. There are many uncertainties in the business, it is attended with great and inexpressible anxieties, and is not, by any manner of means, the royal and easy way to fortune that the inexperienced often imagine. The vicissitudes of the weather, insect-life, etc., are such that what promises

everything we could wish to-day, is dispelled with the coming of the morrow, and the work and toil and expense of a year are ever present to mock you, ever yoked to your labor. Thus from year to year may the illusions of hope be dispelled, and often and often again, may the very fruit you are actually grasping be turned to ashes on your lips.

Chapter II.

PROPAGATING THE TREE.

I declare and affirm as my opinion, without any reservation whatever, that the Peach should be grown only from the seed of the natural or unbudded fruit. Nature advances and does not retrograde, and this crime against nature, of breeding in-and-in, is followed in all phases of life by degenerate offspring, and these, not being fit to live to propagate the species, are self-devoured, as it were, to make room for the perfect specimens of the species—for only the fittest shall survive. I attribute a great deal of the loss and disappointment in the peach business to the reckless, careless, nay, almost criminal way in which the propagation of the trees has been carried on. I personally know where seed from evaporators has been taken away indiscriminately for the purpose of raising nursery-stock, and I know that among these seeds were thousands that had come from diseased and premature trees.

Not only should the seed be from natural fruit, but even this should be carefully gone over; only the very best specimens being selected for planting, and in this

way may we make the start for perfect trees. The seed may be obtained in North Carolina, Virginia, Tennessee, Georgia, probably on our own peninsula, and some in Michigan. The strictest care should be exercised in its selection, and it would be a grand thing if every seed that comes into the peninsula could undergo legal inspection before it is planted. The cost of the seed varies from $2.00 to $5.00 per bushel, and ten to fifteen bushels will seed an acre of ground, depending, of course, on the distance they are placed apart.

For nursery-stock, any good, sandy, or mellow loam, or the light, sandy soils of the peninsula will do. The ground should be thoroughly prepared by ploughing harrowing and rolling ; no fertilizer is required if the ground will raise forty bushels of corn to the acre ; for it is not well to force young trees too rapidly. Run out the rows from three and a-half to four feet apart, and one to two inches deep. This is best done by a sled-like machine made for the purpose. The time to plant the seed is from October 10th, to freezing weather. In examining into this matter, I am persuaded that the best take will come from those seed planted not later than October 20th. The seed may be laid touching each other, or some two or three inches apart. Three inches apart is, probably best, and then cover the seed by a rake, or with the feet. The seed remaining in the ground all winter are cracked by the frost, and in the spring

germinate and grow. When the trees have well appeared, they should have the ground stirred about them and be worked just about as we work corn through the season, throwing a furrow from them, and then again to them, and cultivating out the middles time and again. Don't fertilize unless the trees make very poor growth, or you are forcing them for June budding. Another method of planting is to spread the seeds over the ground and spade or plough them in, taking up in spring, when sprouting, cracking those not sprouted and transplanting to nursery-row. This way is obviously so inferior to the first plan as to need no further reference. There are other methods of which I will not speak, for the same reason. The rows, to get better light and heat, are recommended by Fulton to be run north and south. Of course should the trees come up too thick they should be thinned, say to four inches, and this will be found close enough to give a good tree and afford room to the budder. The trees should be worked until well advanced, at least into June, and even after that kept clean by hand, if necessary, of all weeds. If you want June-budded trees they had better be forced a little by barn-yard or stable-manure, thoroughly rotted, or by an ammoniated super-phosphate.

BUDDING.

What I had to say of the natural seed applies equally to the bud—it should be obtained from a perfectly healthy tree, from a known variety, and from a

tree known to have been raised from a natural seed. The Peach may also be propagated by grafting, but this mode is seldom or never resorted to now. In England the peach is generally budded on the plum, because it is thus dwarfed, and grows better against walls, the only way it can be raised out of doors there. On the peninsula we bud from June to September, or as long as the sap flows freely; but a vast majority of the trees are budded in August, which is, undoubtedly, the best month, all things considered. As before remarked, if the trees are to be budded in June they need a little forcing to give size. A man and two boys make a budding-team; the man buds, one boy ties after him, and the other boy goes ahead and strips the trees of buds and leaves four inches or more above the ground. The buds may be obtained from nursery-stock or from bearing-orchards. The former are thought to take best; of course the bud must be a leaf-bud and not a fruit-bud. The buds are obtained from the very best twigs of the season's growth, always selecting the best buds on the twig, and using them only. Cut off all leaves a short distance from the twig and keep the stick with buds on it moist until needed for use. The budder will cut them as he needs them, with a sharp knife, taking an elliptical piece of the bark only, reaching a quarter of an inch more or less above and below the bud. Now, with a budding-knife, he cuts a T shaped

incision through the bark, slits it up slightly, and deftly inserts the bud as near the ground as possible, and not over four inches above it, at most. The boy ahead has previously stripped the tree, to this point, of buds and leaves, and the boy behind ties the bud in with a bass-wood tie, which may now be found on sale ready-made, having formerly to be pulled from old mats. The best tie is a figure-of-eight, knotted around the bud. These trees having been budded in June are left until the buds are seen to have taken, say ten to twenty days, when the ties are cut on those that have taken, and those which have not taken can be marked and budded over, but probably might just as well be pulled up. Very soon now the tops must be cut away just above the new bud, all buds be kept rubbed off of the parent stock below *the* bud, and the young tree may be set out the next fall or spring in the permanent orchard. Later budding in August or September does not differ much from the June budding, save that the tops are not cut off until the next spring, after the sap has just begun to flow. Then the old stock is kept rubbed free from buds below the new bud. Very little, if any pruning, is needed by the young trees, and the coming fall or spring they are fit to set in the orchard—two years from the seed and one year from the bud being apparently the proper age, although I know some of the most intelligent and successful growers who prefer the June-budded

trees because they can be dug with the tap-roots entire and are easy of carriage, etc. In the peninsula nurseries the trees are now generally dug with a tree-plough and baled with baling-cloth with the roots packed in moist moss, or they may be packed in boxes, with moist moss, in which condition they may go safely around the world; the great danger being from too much heat rather than too much cold. If the trees in transportation get in too hot a place, fermentation may ensue and the vitality be destroyed, and the same may happen if they freeze, but first-class packing will usually avoid these evils. I have never lost trees but once, and they came from New York State, disgracefully packed only in a few leaves ; consequently they froze, and many of them were ruined.

Taking up and shipping the trees is of vast importance to the grower and to the producer too, for mixing the varieties or doing the work so as to injure the trees must ruin the latter's reputation and be a source of irremediable loss and disappointment to the former. The nurserymen now do their work with such system and intelligence that I am glad to say very little complaint comes of any errors committed in the business, and it is a business, at once to the body, laborious, and to the mind, exhausting.

Chapter III.

LOCATING THE ORCHARD.

Before writing this book, among other questions to which I requested answers from prominent growers, was, "What is the best soil for a peach-orchard, and what is the best location as to hill, valley, etc.?" Answers to these questions will be found under the proper head. Here, I wish to give my own opinions. The peach-orchard should be on land as nearly level in all parts as possible, to give an average crop. Peaches do not, as a rule, do well on hill-sides, and, although in valleys they often bear abundantly and freely of the finest fruit, yet in them they are much more susceptible to death from frost, mature their wood too rapidly, and are apt to shed their fruit at some time in the season and be deficient in color. On hill-sides, as a rule, the trees do not thrive, and the fruit lacks all good points, except, perhaps, color. I like water, fresh or salt, especially fresh, near an orchard, and to the north, east or west of it, and it is better if the orchard be on a peninsula. I especially like water to the north and to the west, for freezing is a warming process, paradoxical as it may appear, and the

heat given out often saves winter-killing of wood and buds, as we saw in the cold winter of '80 and '81, when all the peaches we had were grown near water. I want no woods or other shelter near my orchard. If I must have it, let it be to the east, and not to the north or the west. If to the north or the west, then the trees are sheltered, are forced ahead too early in the spring, and are thus more vulnerable to late frosts. I say again, I don't seek any shelter, but an eastern shelter may possibly save my crop, when a severe, cold, easterly storm comes at the last of the bloom. Yet, altogether, I believe even the eastern shelter, say in a period of ten years, would do more harm than good. As to soil, all the soil of the peninsula is more or less suitable to the peach, and there are many differences of opinion as to the very best. I believe the very best soil, if I could have the selecting of it, to be a strong, mellow loam, in fair agricultural condition, with only a moderate amount of sand, with an open, well drained sub-soil of yellow or red clay, containing, naturally, a large amount of potash and iron, under which you would find water by digging down twenty to thirty feet. In this soil I should expect, with proper, healthy, thrifty trees, and careful culture, good crops of fruit, with good size, good flavor and high color, and these cover all the good points in peach-culture.

PLANTING THE TREES.

When you plant an orchard always choose the very

best location on your property that has not been in peaches before, and, keeping in view the advice I have given, you will probably not err. Plant trees from eighteen to twenty feet apart, according as your land and culture will bring large or small trees. The former will give you one hundred and nine trees to the acre, the latter, one hundred and thirty-four trees, and each will be right, on its proper soil. The trees may be planted in the autumn or in the spring. The majority of growers prefer the autumn ; then they have more time, they get the trees in good condition and fresh dug, the latter not having been "heeled in" all winter ; as spring trees often have been when they come from the nursery. Again, the tree has settled and is ready to go off at once in the spring, after having been planted in the fall. Outside of these reasons it really doesn't make much difference whether the trees are planted in the spring or in the autumn. The ground, I think, should be ploughed deep, and thoroughly prepared, as for a premium wheat or corn crop, before the trees are planted, although the general custom is to turn a few furrows, plant the trees, and defer further cultivation until the spring. Thorough preparation destroys the bedding for mice, and, hence, will check their depredations, and this is important. The rows may be run by the plough, and cross-furrows where the trees are to be set. The holes should be wide enough to receive the roots without cramping, and deep

enough to set the tree a very little, if any, deeper than when it grew in the nursery. Set the tree, straighten out the roots, and put in one-third of the hole full of soil, then shake the tree up and down VERY slightly, tramp moderately, and fill up with soil nearly to the top; tramp well again, and then take the soil, and bank around the tree three or four inches up the stalk, and you have finished. It will be seen that in the operation all sub-soil has been discarded in filling up the hole. I should have said that before planting the tree the roots should be freed from all broken or bruised ends, and the same with the tops or branches. If trees should be frozen when received from the nursery, the best treatment is to put the whole package, box and all, without opening it, in a cellar until thawed out, and then plant; or if in the fall, "heel-in" until spring. If they come in the spring dry and shriveled, bury the entire tree in a deep, wide trench and saturate the soil with water after they have been covered, and allow them to thus remain six to nine days, until they look properly; or sink the bundle under water and hold them there four days, then plant and cut the tops back. But I don't like to plant, under any circumstances, a tree that has been frozen. Should the trees be found to be heated when received, or the moss moulded and fire-fanged, as it is termed, it is doubtful whether the trees would survive, and those that did live would be dis-

appointing and unsatisfactory, for a time, at least. If cold weather catches you in planting, stop and "heel-in" the trees until spring.

Whether the trees have been planted in the autumn or in the spring, they should be headed back in the spring and trimmed up, ready for the start. Cut off the top to three, or three and a half feet, or cut it off to two feet, as you want your tree to head high or low. I prefer about three feet to three feet and a half, as such an orchard will be easier to get about in. Cut off all lateral branches, and your work is finished as far as the tree itself is concerned. It is the custom on the peninsula to work the young orchard in corn for the first two or three years. Two years are enough; the third year won't pay and is bad for the trees; besides, there may be a crop of fruit the third year, although this is not desirable for the trees; but life is short and it helps the pocket, and we don't often pull them off prematurely for the good of the trees. Others prefer to work young trees in low crops, as tomatoes, etc., thinking that the trees do better. I don't know that it makes much difference. I would suggest raspberries as a crop in small orchards.

PRUNING.

As stated above, the tree should be pruned of its top and all branches, the first spring, and the top should be cut off to within three to three and a half feet of the

ground to make it head properly. This is the preferable point, altho' others head them to two feet, or even less. It makes no difference, except as to convenience of working the orchard, and picking the fruit in after years. The branches below the head should be kept off the first year or two, all suckers removed, and any straggling outside branches kept cut off, but, until the tree has borne a crop of fruit, I doubt the propriety of cutting out the middles, as in here the first fruit crop most usually grows, and by severe pruning at this time the tree is not benefited, and much loss in fruit may occur. It is well to let the sun into peach trees ; therefore cut out all crossing and interfering branches, all dead wood, and all limbs that have been cracked or broken. When this has been done, as a rule, the tree has sufficient pruning. Ths saw and the pruning knife are used, and as a rule the wounds heal without aid or interference. Some trim very "hard" for fruit, but I doubt the propriety of this. Cutting back the new wood is not much practised on the peninsula. It would do good, doubtlessly, if the tree was languishing, and sickly, and will be referred to again. So intelligent an observer as William M. Knight, Esq., of Cecil county, Md., told me that he once saw a thrifty middle-aged orchard treated by cutting back all the new wood one-half and given good culture, etc.; in a year when all the neighboring orchards had good crops, the crop on that orchard was

of the poorest, knottiest little peaches it had ever yielded before, or has ever yielded since. The treatment did harm to that crop and no good to those that came afterwards. The peach is an enigma, and its treatment has not yet been reduced to an exact science, by any means. Probably the majority of growers do their trimming after the picking season is over; then they take out all dead wood, broken limbs and interfering cross-limbs, and cut off all suckers, and this is the sum of their pruning. Others, again, trim in the winter and spring, for the benefit of the tree, and some later in summer, to force fruiting; others trim whenever their knives are sharp, and they see an indication of suckers; this last method is good anyhow. I prefer to snug up the orchard after the picking season; any radical trimming, if necessary, I do in the latter part of the winter, and in early spring, and if I want to cut back new wood, to do it later in the spring. As to fancy pruning and training, they are not practised in practical peach-culture on the peninsula, but at the same time it is not right to leave the tree altogether without pruning, for the budded peach, in particular, requires care and cultivation, and in this care and cultivation, judicious pruning has its share. Hand-thinning of the fruit is not practised on the peninsula—nature accomplishes all that in the June drop.

Chapter IV.

Cultivation of the Orchard.

Before entering into the matter of cultivating the orchard I will say here, that should one wish to plant Peach trees on land inclined to be heavy and clayey, and with a sub-soil not porous, or in a soil from which the water does not vanish after a rain, in a reasonable time, the first step would be to underdrain that soil, thoroughly, for any crop, but more particularly for the peach. Run the drains, surface and underdrains, both, so as to cut off all the springs, bringing the land into condition at once to raise a good crop of corn ; then on such land you may plant Peach trees, and if your trees should go too much to wood and drop their fruit, or be lacking in color, or suffer with leaf-curl, you must still further dry out the ground or fail in your orchard. Now, when shall we begin to cultivate the orchard, and how? My own observation and experience lead me to practise and advocate early ploughing in the spring, just as soon as it is possible to start the plough and make good work. By so doing we give the roots a slight pruning, thus checking a too rapid tendency to development of the buds, and they, being held back, are not so liable to be injured by the early frosts. On the other hand, experienced growers tell us to wait until after corn has

been planted before ploughing the peach-orchard, for the ground being covered with dead grass, etc., will attract frost less, and thus save the crop from its ravages. On the whole, probably, very few now advocate this view, and nearly all growers advise early ploughing. Some advocate re-ploughing in the fall, especially old orchards. This may do when there is a rank growth of weeds, grasses, etc., to check the ravages of rabbits, mice, etc., and throws the soil open to oxydation; but, as a rule, I don't think autumn ploughing necessary or advantageous.

How shall we plough, and how often? Plough not over four inches in the middle, and shallower still around the trees, with a small plough. A majority plough once, and work up to the trees with harrow and cultivator. It does not make a great difference, but it is probably better to plough twice at slight intervals, first throwing furrows from the trees, and in the second ploughing, throwing them back to the trees. After ploughing, harrow thoroughly, and keep the cultivator going as often as shall be necessary to keep the ground clear of all weeds and grasses, and only stop when the fruit bends down the limbs so as to impede the horses. This time will be about from the tenth to the twentieth of June. After this, no more tillage until the next season. If any noxious weeds grow later, they may be cut off and allowed to decay on the ground, as they

impede the pickers, and render them very uncomfortable by wetting their clothing on rainy days and dewy mornings.

Too much stress cannot be laid on the cultivation of the orchard. An orchard uncultivated for a season can never be properly reclaimed. By cultivation we destroy insect-life and open up the soil for the introduction of food to the tree ; we allow oxydation of the iron and other elements of the soil to go on ; we scatter and disintegrate the fertilizers applied to the land, keep down the growth of weeds and grasses, and instead of allowing them to sap the ground for their own nourishment, we turn them into additional food for the tree. I know of one very successful grower who advocates ploughing eight inches deep, but as a rule I recommend shallower ploughing.

FERTILIZATION OF THE ORCHARD.

Until very recently, the fertilization of the peach-orchard was taken little account of, even by the most intelligent and progressive growers. The Peninsula was thought to be the home of the peach, that home being stored with inexhaustible supplies, laid away in its soil, of potash and phosphoric acid, of iron and of magnesia, and all other favorite dishes upon which the dainty peach feeds. The latter grew and thrived, and brought riches and happiness to the fortunate growers,

until, after a time, the trees in his locality failed, and he said to himself, "the soil is exhausted and I do not "know the cause, but the trees won't grow, and I will "hie me down the State and take up new land and grow "the fruit as successfully as I did up the State." So he did, and so have his sons been doing, but the day of reckoning is at hand, and necessity, the great mother of invention, will find out the cause of this inability of the land to grow the peach ; will find out the cause and the reason of this exhaustion of the soil. Will find out the cause ? Why, is the cause a hidden one ? I trow not. Will a given field produce wheat year after year without its being furnished plant-food ? Will a given field produce corn, year after year, without proper sustenance being afforded for the corn ? Will the bee make honey without the flower ? No ! Nor is it any more reasonable to ask that the land will produce peaches without its being supplied with food for the peaches to feed upon. Heretofore, we have rested satisfied when we have peached the land over, and settled down, thoroughly satisfied of its exhaustion, aud that there was no remedy for it. It may be assumed that peaches have gone out, in districts, and though there are plenty of fields in those districts which have never been planted in peaches, yet if we plant peaches in them they won't thrive, showing that it is the locality and not the soil. It may be replied here, that there are other influences

at work in such districts beyond the absolute exhaustion from the soil of Peach-tree food, and the answer at the proper time will be that by additions of improper food to the soil, the peach, as it were, may be rendered dyspeptic, and parasitic growths may be engendered and overwhelm it whilst dwelling in the very halls of wealth and luxury.

The first factor in fertilizing the orchard is the dead foliage and debris of the trees, with the dead grasses and weeds dropping and decomposing, and again being resolved into the elements, thus furnishing over again plant-food. In a healthy orchard this is an important aid to growth, but in an orchard with diseased wood and foliage, they may breed disease and death, by the propagation of fungi. Organic life only being developed on the outside of the earth's crust, where it can receive the light and heat of the sun, therefore, these are elements in fertilization, as is also the rain-water which falls from heaven, together with ammonia, and then, again, the impurities of the atmosphere, injurious to animal life are food for the trees, such as carbonic acid, ammonia, etc.

Before going further it will be well to see what is the composition of the Peach wood—healthy and diseased—and see if we can find what elements may be lacking, or in excess, in the diseased wood. For these analyses I

quote from the report of the Connecticut State Board of Agriculture for 1884. The analyses are as follows:

Ash of Healthy Tree.		*Ash of Diseased Tree.*	
Silica and matters insoluble in acid	5.38		9.47
Oxide of Iron	1.09		2.09
Lime	54.20		54.05
Magnesia	9.49		7.49
Potash	16.31		13.95
Soda	1.18		1.19
Phosphoric acid.	4.34		4.68
Sulphuric acid	6.90		6.53
Chlorine	46		43
Total,	99.35	Total,	99.88

The report goes on to state that, in comparing the above analyses, we note that the ash of diseased twigs contains

4.09	per	cent.	more	Silica, etc.,
1.00	"	"	"	Oxide of Iron,
.34	"	"	"	Phosphoric acid,
.15	"	"	less	Lime,
2.00	"	"	"	Magnesia,
2.36	"	"	"	Potash,
.37	"	"	"	Sulphuric acid,

than the ash of healthy twigs. From the same source I take a copy of Dr. Goessmann's analysis of the ash of

the wood of a Peach-tree affected with Yellows. It contains

0.93	per cent.	more	Oxide of Iron,
9.71	" "	"	Lime,
2.70	" "	"	Magnesia,
3.00	" "	less	Phosphoric acid,
10.34	" "	"	Potash,

than the ash of healthy trees. Dr. Goessmann infers from his experiments that the wood and fruits of diseased trees contain less potash and more lime than the healthy wood and fruit.

But, again, here is another analysis where 10.000 lbs. of diseased twigs would contain

5.2	lbs.	more	Silica,
1.3	"	"	Oxide of Iron,
14.5	"	less	Lime,
5.7	"	"	Magnesia,
8.1	"	"	Potash,
0.3	"	"	Soda,
0.6	"	"	Phosphoric acid,
2.4	"	"	Sulphuric acid,
.2	"	"	Chlorine,

than the healthy twigs. The diseased twigs here manifest as compared with healthy ones, a poverty of all the ash ingredients, except the two first. The most important deficiencies are lime and potash, magnesia

and sulphuric acid. The same report says that Drs. Goessmann and Penhallow indicate that chlorine, though in small quantity, is important in the foliage, as a means of assisting in the transfer of the nutritive matters from the leaves to the buds, and, therefore, must not be deficient in the soil, although not much is needed. Dr. Goessmann is good authority, and has given much attention to the peach question, and if the diseased tree really does contain more lime than the healthy tree, then an important point, I think, has been solved, in fertilizing the peach orchard.

By comparison of the analyses, the general manures made on the farm, with their potash, soda, iron, magnesia, lime, chlorine, phosphoric acid, ammonia, etc., ought to be almost perfect fertilizers for the Peach tree, and are so considered by some of our most intelligent and successful growers. Now I confess that, except it be thoroughly composted, and every part of its organic matter be thoroughly decomposed, which is somewhat difficult to accompllsh in a reasonable time, I am becomiug somewhat suspicious of barn-yard manure as an article of diet for the peach. It is beginning to be noticed by more than one observer among our practical growers, that in soils made rich by the application of barn-yard manure and lime, such as the upper New Castle county soils have been, particularly about Delaware City, where, formerly, were such flourishing

orchards, the Yellows has almost invariably appeared and destroyed, with ruthless hand, everything before it; and I have personally, particularly observed, that yet, in this locality, peaches can be grown, if at all, only on lands which have not received the heavy dressings of lime and grain-fed manures, which have been so generously applied to most of the fine farms in that locality. I incline to think that we are reaching the bottom of some of the peach troubles, and that this very excellent fertilizer, barn-yard manure, causes directly, or indirectly, the development of the germs or fungi engaged in sapping the life of the Peach tree. If I am right in my conjecture of this apparent effect from an apparent cause, we will condemn, and ought to condemn, the application of barn-yard manure in its usual form, to the orchard, and condemn it on these empirical grounds alone; and I yet hope that this empiricism will soon be supplanted by solid scientific fact. Of these matters we shall speak again, when we come to consider the diseases of the peach. Now, reasoning from a chemical standpoint, we would say, apply

LIME,

and thus quicken the forces of decay, and destroy the spores of the fungi which may come from the manure. Practice has not shown that to be effectual, if trouble comes from applying raw barn-yard manure, but on the other hand, where they have been applied one with the

other, the fact remains that there the peach has ceased to thrive, and almost ceased to live at all. If I need lime on an orchard, it would be on one not under eight years of age. Where the soil was rather stiff, or moist and sour, and where there was a tendency to strong growth of grass and weeds, I would use not over forty bushels of slacked lime, broad-cast, per acre. Here it would decompose the vegetable elements, correcting acidity, and probably act on the iron salts, and more readily cause them to change to peroxides, thus fitting them for plant-food. I can give you plenty of reasons why lime would be a benefit (caustic or quick-lime, as generally used,) to Peach trees, because as stated above, it decomposes vegetable elements, corrects acidity, changes iron salts, and is most destructive to mosses, to lichens, and to fungi; and on these grounds John Rutter bases his very sensible reasons for using quick-lime on the peach, and being a believer in the germ theory as the destroying agent of the tree, he advocates the use of caustic lime and potash to destroy these germs and save the trees; and he believes he has accomplished it, but experience has not yet confirmed it. I say again, I can give scientific reasons for the use of quick-lime as a fertilizer, and why it should be good for the peach, but again I say, that where ground has been fertilized by lime and barn-yard manures, the Yellows has asserted its sway and annihilated the peach. This is not extra-

ordinary. The chemist can do many things by rule, and chemical laws are infallible, but he cannot use the human stomach for a retort, any more than he can the cell of a Peach tree, because in his own retort he can apply chemical laws, and in the case of the human stomach or of the tree-cell, he can only apply his laws, subject to the retarding or advancing effects of vital action—OF LIFE.

The peach is always produced on the wood of the previous year, and the development of this wood and the general appearance of the trees are the best guides to follow in fertilizing. Should the wood of the previous year, if the season has been an ordinary one, not look strong and healthy and not have made a general average growth of, say, seven inches in length and the buds not full and vigorous looking, these conditions would call for fertilizing, and in that fertilizer should be incorporated more or less ammonia. If the trees were vigorous and doing well, then I would use fertilizers containing potash and phosphoric acid, with the iron and chlorine, etc., incidentally contained. Recollect that the peach is a thorough-bred among fruit trees, needing close watching and vigorous culture; its food should be accurately supplied, and it should neither be stinted nor, what is equally important, must it be overfed. If the tree is declining it needs full nourishment, and here we must give it the proper elements. If it has borne a large crop

of fruit the previous year, we must give it extra sustenance, but in average years it needs only a well regulated supply, and the important point to determine is just how much to give it. It will be observed that the average supply of food recommended is large, and such application every year without regard to the before-mentioned conditions is, in my opinion, wrong. We want to strike moderate and regular blows, and only use the sledge now and again to accomplish a certain purpose.

POTASH.

Undoubtedly, one of the most important elements in peach-food is Potash, and we use it in the forms of commercial sulphate or muriate, and in wood-ashes. Wood-ashes contain probably all elements of plant-food except nitrogen, and the elements in one hundred pounds of ashes would cost over one dollar if bought at market prices. A bushel of peach-tree ashes is said to represent two and one-half tons of dry peach wood, and the value of the ashes of other trees varies as to the woods. Fifty to seventy-five bushels of ashes would be a strong dressing per acre, but it may be applied, a shovelful or two around the trees, and do immense good. Kainit or German Potash-salt is a valuable fertilizer, as may be seen by the following analysis:

Sulphate of Potash..... 24.80 per cent.
Sulphate of Magnesia..... 14.30 " "

Chloride of Sodium	32.00	"	"
Chloride of Magnesia	12.62	"	"
Moisture	14.36	"	"
Insoluble matter	1.92	"	"
Total,	100.00		

The common salt here contained I consider very valuable; it is destructive to germ-growth and its chlorine is advantageous. Prof. Maynard of Mass., says that potash acts by setting the starch in motion, by dissolving this and assisting leaf-vigor, and in the leaves assists the change of starch into sugar. He thinks the chlorine helps in this process and for this reason he prefers the muriate of potash, but the above analysis of kainit shows considerable chlorine, besides other valuable plant-foods, and I don't hesitate to recommend it, at least in alternate years, with the muriate.

After ploughing in the spring, apply kainit broadcast, from 200 to 500 lbs per acre, and harrow it in. Use more or less, after applying the rules given for fertilizing. It may be applied in the autumn in the same quantity and in the same way and allowed to remain on the ground and be ploughed in in the spring. It is claimed to sometimes act better in this way. It has the faculty of effecting a prompt action of the ammonia of the decomposing organic matters it comes into contact with.

It is recommended in using kainit on grain crops to sow the autumn before, and incorporate it with lime in some cases, to check too free chlorine evolvement, which might injure the grain-plant. No such care, I believe, need be taken in applying it to fruit trees. I believe I have previously stated that I am not much in favor of fertilizing young trees on good soil until after they have borne the first crop, which should be the third or fourth season, unless I see a special necessity, and in applying potash fertilizers, especially in their crude state, don't apply them in contact with the young trees or they will seriously injure, if not kill them.

Potash is known to the chemist as Potassium Oxide, and this is its valuable fertilizing ingredient. It must be soluble in water as plant-food and we get it as sulphate and muriate for agricultural purposes. We have spoken of the sulphate in kainit. The sulphate-salt is expensive and we use, generally, when we want a potash fertilizer, the muriate known to the chemist as Potassium Chloride. The muriate of Potash is valuable to the peach not only for its potash, but for the chlorine; and, as I said before, this chlorine is useful in the leaf in the process of changing starch to sugar, which process is said to go on at night, and Dr. Goessmann says the muriate has the faculty beyond the sulphate of liquefying the starch in the cells and setting it in motion, thus promoting healthy nutrition. Be this as it may, it gives

grand results in peach culture. Muriate of Potash may be applied to the peach tree after ploughing, by scattering from two to five lbs. around the tree, using the larger quantity on large trees only; keeping it at least one foot from the base of the tree, and scattering as far as the branches extend. It may be employed in connection with acid phosphate (commonly so called) in the same proportions and in the same way, and it may be used with numerous other matters, examples of which we will presently give in formulae. Phosphoric acid is very important food for the tree and we apply it generally in the form of super-phosphate alone, or joined with potash, ammonia, magnesia, etc. Plain super-phosphate may be drilled in, after ploughing and harrowing in the spring, from 200 to 500 lbs. per acre. Ammonia had better be applied in a commercial fertilizer containing .02 to .03 per cent. ammonia with Potash and phosphoric acid, and put on at the rate of 200 to 400 lbs. per acre. There is, generally, sufficient magnesia in the soil, but, if needed, it can be applied as given in some of the formulæ given in another place. Iron may be needed in the peach, and if I had an orchard that was stubbornly unthrifty I should try iron, among other things. My friend, Dr. C. Elton Buck, the accomplished chemist of the Walton and Whann Company, tells me that there is, in his opinion, iron sufficient in the Peninsula soil for peaches, and it is constantly being thrown up to the air

for use by cultivation, and changed to the peroxide, the form in which it is available for plant-food. The color of all soils is, probably, produced by iron, and, of course, nearly all soils contain it, and tillage renders it available. Still, if my orchard did not thrive I would use some iron about the trees in a metallic state. Get the scrapings of a blacksmith-shop, especially where horses are shod, and thus get the hoof-parings, etc., and iron-scales. Also iron-scales from rolling-mills, etc. A salt of iron in a fertilizer with phosphoric acid, etc., would be expensive and of doubtful propriety, as it might cause the reversion of the phosphoric acid to its insoluble state as phosphate of iron and alumina, which exists in crude phosphate. The scales of rolling-mills, blacksmiths' forges, etc., are generally the magnetic oxide of iron, and they get a little oxygen from the air and from moisture. Subject them to damp earth, etc., by putting them around the tree, and they change to the hydrated peroxide of iron, the form of iron available as plant-food. The chemist, I believe, would tell you that they change from FE_3O_4 to $FE_2O_3 + H_2O$.

Pruning may act directly as a fertilizer. When the trees languish, and especially if old, cut out the middles well, and cut back the new wood one-half, or top them altogether, and let a new top come out with strong help from fertilizers. In some places old orchards are doing well and new orchards prematuring. It is my advice to

keep an old orchard as long as it can possibly be made to yield fair returns. A failing orchard may be seeded to clover in the spring and ploughed under, the next June a year, thus getting much nitrogen, etc., from the crop of clover. There is a prevailing opinion that clover in a peach orchard is death to the trees. Lack of cultivation for the time is probably the trouble. I recommend the appended formulæ to be applied according to the rules given for fertilizing the Peach tree. For an orchard much run down with new wood under an average of nine to twelve inches, with fruit lacking color and flavor, the following is a good formula, and is recommended by Prof. Maynard in part :

FORMULA NO. 1.

Acid phosphate	400 lbs.
Muriate potash	150 "
Crude sulphate magnesia	100 "
Azotin	125 "

applied to each acre. This is a very strong dressing and I would apply it only in case of Yellows, or trees rapidly declining from any cause. One-half or one-third the quantity may be applied, as occasion requires. Potash alone is said to cause late growth. Phosphoric acid causes early growth, and magnesia helps to diffuse and retain the potash in the soil, and helps the flavor of the peach, whilst ammonia makes the wood and improves the color.

FORMULA NO. 2.

Acid phosphate	1600 lbs.
Muriate potash	400 "

Apply this by drilling 200 to 400 lbs. per acre, in the spring, after first ploughing and harrowing. Pure ground bone, 200 to 600 lbs. to the acre, may be used alone or in combination. It will cause the tissues of the tree to mature.

Here is a formula that has been recommended for worn out trees. I have never tried it. Before giving this I will state that I have made some experiments, looking to furnishing a supply of prussic acid to the peach, but as yet have no success to report.

FORMULA NO. 3.

Kieserite	80 lbs.
Muriate Potash	500 "
Bone-Black	1420 "
Total,	2000

Apply from three to nine lbs. to each tree, beginning within six inches of the trunk and extending out as far as the branches extend. Apply after ploughing, and then harrow in.

It is not necessary to give any great number of formulæ. Select any good fertilizer made by a reliable firm and use according to the rules laid down in this

book. If you want only kainit, use it alone or join it with acid phosphate, one part to two of the latter, and apply from 200 to 600 lbs. to the acre. If you want potash, use any good potash and acid fertilizer in quantities to be regulated by the rules given, and if you think you need ammonia in addition to the phosphoric acid and potash, then use a good super-phosphate with, say .03 per cent of ammonia, and apply as occasion requires; thus you will give all the food the peach-tree needs for honest crops from well-fed trees.

The peach-tree bark often becomes affected with lice (*Aphis Persica*) and other pests, and it is important to destroy them; for this purpose the following wash may be recommended, to be applied with a swab, working it well into the crevices of the bark, and well down to the roots. It may be used as often as necessary and is, in a measure, a fertilizer from the soap, etc., contained.

TREE WASH.

For 100 trees take four fluid ounces crude carbolic acid, one quart soft soap, and mix thoroughly with one half-gallon boiling water. Let it stand twenty-four hours, then add two gallons rain-water, stirring all the time you are swabbing it on the trees. Always apply washes about June first, as they kill eggs and drive off moths, etc. Other washes may be made by adding a quart or two of crude carbolic acid to a half barrel of whitewash, or by adding sulphur to whitewash, a handful

to the gallon. Whilst on the subject of washes let me recommend, in trimming diseased trees, or even healthy trees, the use of germicides on your saw or knife, before passing from one tree to another, as I believe disease germs may be carried, and thus healthy trees become inoculated. This should especially be done when trees have Peach-yellows or Pear-blight.

GERMICIDES FOR THE SAW OR KNIFE.

Linseed Oil..... ....1 quart.
Crude carbolic acid.....4 fluid ounces.
Mix them and grease the saw or knife.

Another may be made by dissolving seven and one-half grains corrosive sublimate in one gallon hot water ; dip the saw or knlfe in this before using on a second tree, or probably what would be better in many cases of Peach-Yellows and Pear-blight on a second branch. The objection to this last is that it is very poisonous and might be mistaken for water, being colorless ; therefore, it should be handled, if used at all, with the greatest care. If any of it should be swallowed, white of egg, internally, will render it harmless. The oil and carbolic acid is also poisonous, but the odor and other physical properties make it much safer. Thomas Taylor, microscopist at the Agricultural Department, Washington, D. C., suggests, in order to destroy the spores which may be a cause of Yellows and other diseases, the

application of hot lye to the bark and roots of diseased trees. On the same principle, he advocates the application of alkaline washes and washes of sulphates and their compounds. Here copperas, one pound to the gallon of water, might do good or even a half-pound to the gallon. He also thinks that sulphide of calcium may be appled with good effect, and that anything which protects the trunk and the limbs will do good. Whitewash made from gas lime will contain sufficient sulphide of calcium for the purpose, and is therefore a valuable tree wash.

Chapter V.

DISEASES AND ENEMIES OF THE PEACH.

YELLOWS.

I believe that Yellows is a bacterial disease, as is now understood. I believe these bacteria exist in the healthy tree and even in healthy men, but when their number becomes greatly increased, which may take place rapidly under favorable circumstances to an infinitesimal number, they become a disease. They, we are taught to believe, develope into fungi, (mushroom growths,) probably through Mycelia (the spawn of fungi.) Bacteria are monads, (monads are ultimate atoms, a primary division of matter,) having a low, vegetable life, and are liable to appear in any substance containing life. They are of different forms, and move actively, and are, of course, microscopic. They probably act as ferments, as in the vegetable-cells in the transformation of starch into sugar. They come from the air, where, probably, their origin is suspended, and with a certain development, which the microscope has not yet discovered, before they can act as a ferment in health and disease, either in animal or vegetable life. They do not

come from spontaneous generation, in my opinion. I am no believer in spontaneous generation. In this day of doubt and trial I say this most emphatically. I see God in nature everywhere, from the inception of this microscopic ultimate atom, to the grand creation of Man—mysterious, wonderful, and complex in being. These bacteria act as organic ferments, (like the torulae, the fungi of yeast,) and are, probably the means, or chief means, of changing starch into sugar in the tree, etc., provided they exist in normal and healthy numbers. Now, from any cause let these bacteria increase a million fold or more, as they may rapidly do, then they become a source of disease, and here, to my mind, we have the cause of Yellows in the peach. I might write pages about these low orders of life, vegetable and animal, yet only weary the reader, and in the end say no more to the point than I have said. These bacteria which I say do exist in healthy trees, becoming increased indefinitely, cause disease. The nutrition of the tree is seriously interfered with, or ceases altogether, because the cell-action is checked or stopped ; the change of starch into sugar is checked or stopped. All these being checked means a diseased tree ; all these being stopped means a dead tree—the cessation of cell-action. These changes may occur suddenly, and we have acute or rapid Yellows, the tree soon dying, Should these changes occur less suddenly, we have chronic or slow Yellows,

and then the tree declines and gradually dies, consuming in the act of dying one or more years, very similar to a sorry victim of consumption among men. I believe Yellows to be a disease of the budded tree, a disease of progress and civilization, as it were, among trees, a disease that exists only among trees crowded together with improper treatment and cultivation, just as diseases from the same cause (zymotic or fermentive diseases) are developed in man, when he is thrown together in gregarious masses, without proper hygienic and dietetic supervision. In man we have fevers, cholera, measles and other horrors, and in the peach, Yellows and other troubles, and in the pear, blight, and so on through nature. I have seen Yellows in the natural tree. The natural tree may get the Yellows because it is a peach, but is not so likely to suffer from it—just as the primitive man did not probably have cholera or zymotic fevers or measles. Neither inherited the tendencies from their progenitors, nor were the germs active, if present, nor were they surrounded by the luxuries of an advanced civilization to the degree of the modern man, or the budded peach, and for these reasons, as we see from observation in life, generally, where there is high development and high culture of the animal or vegetable, it is more obnoxious to disease. I incline to the opinion from practical, and not as yet from scientific, data, that Peach-Yellows is contagious, and can be

carried from tree to tree through diseased seed, through diseased buds, through proximity of soil, and even by pruning instruments going from diseased to healthy trees. So much am I impressed by this suspicion, that I would not haul young trees in a wagon, which had shortly before, hauled the cuttings from pruning a diseased orchard, unless the wagon had been fumigated. I believe this disease-germ may be both in the soil and in the tree, after the soil and tree have been placed by circumstances in a condition to develop it, and for this reason I would not plant a new orchard, at once, on the site from which a diseased orchard had been removed. I believe ploughing and fertilizing, and one year of upturned exposure without cropping, will be apt to destroy the disease-germ, and peaches might be planted again, but I should never recommend this plan if other land were available. Now as to the conditions favorable to the production of this germ of Yellows, I believe it is most likely to be developed where peaches have been planted in one locality in large numbers for a series of years, where orchards have been cropped after their second year, where culture and fertilization have been neglected or omitted, and where the land had previously been made rich (and was so when the trees were planted) by lime and barn-yard or stable manure, where the trees have been raised from the seed of budded trees, and thus have been propagated back and not

advanced, where inattention has been the rule in pruning, and to digging out and burning diseased trees at the first start of the disease. As to lime and manure, they contain the elements of plant-food for the Peach-tree, and really are sure fertilizers for the trees, but somehow in land enriched by them the Yellows appears to thrive, and we know this only empirically as yet, and not scientifically. Experience is showing that potash is a remedy for Yellows, and we know that lime causes an exhaustion of potash in the soil, because it decomposes rocks, stones, sand, etc., containing it, and improperly composted manure may breed the disease-germs during its decomposition. These are facts, probably, and seem to be a finger-board on the road to the solution of the question. As to developing the Yellows, over-fed trees may have the bacteria increased in them beyond the health-ratio, just as well as under-fed trees, and here is a reason we should study so carefully the fertilization of each separate tree. I believe that if the rules I have laid down in this regard be followed, much good may be accomplished by avoiding the production of the disease.

These disease-germs in the sap of the tree, or even in the ground, are really benefited by irregular seasons as to temperature, whilst the vegetable organism of the tree is injured, and hence, what, as peach growers, we fear most, is not so much the cold season within reasonable bounds, as the irregular season of heat and cold,

and often during one of these seasons we know that Yellows flourishes ; I think this is a practical proof of its germ-origin. Thos. Taylor, of the Agricultural Department, Washington, has examined and experimented with the bark of healthy and unhealthy Peach trees, and found a fungus in the unhealthy, the healthy bark being free from fungi. Mr. Taylor had leaves of the healthy and unhealthy trees analyzed, and found as follows :

	Healthy Peach Leaves.	*Unhealthy Peach Leaves.*
Moisture	29.20	36.9
Organic Matter	63.22	59.4
Ash	7.58	3.7
Total	100.00	Total, 100.00

Here, in the unhealthy tree there is a deficiency of ash ; there is less organic matter and more moisture than in healthy leaves. Now, Mr. Taylor says, as leaves don't absorb earthy matter from the atmosphere, it is evident that the cellular structure of the tree has failed to perform its functions, for had the ascending sap carried up potash, lime, or other earthy matter, the leaves would have been stored with them, since they can't evaporate them. This deficiency of earthy matters in the leaves may account for the absence of ash in the fruit. If the leaves elaborate juice for the growth of the fruit, the leaves being deprived of proper nourishment, the fruit cannot mature. Now trees with yellows, fruit earlier

and prematurely, and prematurely decay. The presence of more sap in the unhealthy, than in the healthy, tree indicates an earlier and greater flow in the former than in the latter. The presence of watery sap in the leaves, twigs and buds, would induce, naturally, an early growth of fruit and premature decay. Thus we argue that the disease is rather in the body of the tree and in the roots, and that the leaves only suffer from this disease, secondarily. Before proceeding further, I want to lay before the reader the present status of the germ-theory of disease—and this applies, as well, to the vegetable as to the animal kingdom. Cohn calls all these disease-germs, *Schizomycetes*, although Bacteria is generally used in the same sense, but, etymologically, the latter only apply to the rod-shaped kind. Cohn makes four forms of *Schizomycetes*, according to Flint. *First*, *Micrococci*, round granules, very minute ; *second*, *Micro-bacteria*, rod-shaped cells ; *third*, *Desmo-bacteria* or *Bacilli*, also rod-shaped longer than *Micro-bacteria* ; *fourth*, *Spirobacteria*, spiral-shaped cells, or organism.

To show the power of reproduction of these germs, it is said that one of them can give rise to 100,000 individuals of its kind in seven hours. Think of it ! suppose a healthy peach tree has 10,000, then conditions favorable to disease surround it and in seven hours there are 1,000,000,000 Bacteria. After a while, when this matter is properly cared for, we will find out the peculiar

form of Bacteria that causes peach-yellows, and I do not despair of a remedy following this discovery. The world moves—science is progressive—God reigns.

SYMPTOMS OF YELLOWS.

Along the branches of a tree, perhaps along one branch, perhaps on several, or all of the branches, but not often on all, for the tree dies before all become affected, we see, growing perpendicularly, and generally on the upper side, slender, wiry shoots, some long, some short, with mean, starved-looking leaves. Then, in the second place, we have the fruit ripening prematurely, from fifteen to thirty days before it should be ripe. It is spotted with beautiful red, or entirely colored—the fatal hectic flush—and is of full size and handsome.

Then we have the yellow, sickly-looking foliage, and the fruit lacks flavor. If the tree lives until the second year, the fruit is reduced greatly in size, to one-half or one-fourth, is mean-looking and poor, yet still having marks of the beautiful red in spots, or coloring half, or more, of the peach. The color runs into the peach around the stone. In some trees the trouble may come in the fruit the first year, and not until the second year may the wiry shoots, characteristic of the disease appear. The tree may die very rapidly in a few weeks, or even days, but usually it lasts two seasons, and in some cases trees may linger, if let alone, for from three to five years.

The disease appears to be confined to the parts of the tree above the ground, no changes having yet been observed in the roots—but I must say that, as yet, they never have been thoroughly and scientifically examined through a series of cases. The disease exists in patches in an orchard, and does not take trees in rotation ; yet, when we have one, more always, sooner or later, surround it.

Yellows has been known on this peninsula since the war of 1812, and is supposed to have been introduced from Pennsylvania, by carrying down improved trees, but it never amounted to a scourge until large orchards began to be cultivated from budded fruit.

REMEDIES FOR YELLOWS.

1st.—Plant only natural seed ; cull the seed thoroughly, using only the best specimens.

2d.—Use only choice buds from choice trees in every way healthy, and from trees that have been raised from natural seed as far back as possible, and budded only from such stock.

3rd.—Use care in selecting the site of the orchard by rules before laid down.

4th.—Cultivate thoroughly by methods heretofore given.

5th.—Prune judiciously. If a tree is attacked, cut out all diseased parts at once, and burn them ; cut back

the new wood at least one-half, and fertilize freely; use the carbolic acid tree-washes. If the next season the tree has not thoroughly revived, pull it out root and branch and burn it; scatter muriate of potash freely in the hole, and fill it up; don't plant another tree here until next season.

6th.—If the tree is bark-bound and the sap appears deficient, slit the trunk and the large branches on two sides for their whole extent, cutting through the bark down to the wood.

7th.—Avoid the use of raw manures of all kinds in the orchard, and use lime very sparingly, if at all, as a fertilizer, for in the absence of potash, the tree appears to take from the soil too large a percentage of lime to supply its average need. Use tree-washes if insects appear in the bark of any or all trees in the orchard.

8th.—In fertilizing, use, chiefly, Chemical Fertilizers, by the rules given, and especially those containing some salt of potash; be careful to worm the trees, if appearances indicate their presence. I would here say that worming is not as much practised as formerly—but this is no reason, nor is there any other reason that I know of, why vigilance in this respect should be relaxed.

In the proceedings of the New Jersey State Horticultural Society, at its tenth annual meeting, held at Trenton, Dec. 29th and 30th, 1884, I find a paper read

by Prof. S. T. Maynard of the Botanic Department of the Massachusetts Agricultural College, which is so interesting and which I feel presents facts of such value that I am sure it will be well worth the space it will occupy, and I give it to my readers almost entire. As Prof. Maynard stated, he presented the subject from a New England stand-point, and the reader must remember that New England differs widely from the Peninsula, in both soil and climate.

"In looking over the history of peach-culture in New England, we find that, when first planted in the early days of its settlement, the trees were very easily grown, and produced large crops of delicious fruit, but soon that fell destroyer of the peach—the yellows—made its appearance. We are told it was very destructive one hundred and twenty years ago, and yet peaches continue to be planted, grow and die, new trees are planted, bear and die, and still the process goes on. With us, the peach is most succesfully grown on high, well drained, loamy soil. The exposure, whether north, south, east or west, seems to make but little difference as to the hardiness of the trees, but the fruit is generally of better quality on a southern slope, than upon a northern one.

About fifteen years ago a lot of some one hundred trees were planted upon a light, stony soil, sloping to the south, and protected by a heavy growth of woods on the

north, about one hundred rods from the orchard. For the first two years they were rather neglected, but the third season they were carefully pruned, and carefully examined for borers, which were destroyed when found; soon indications of disease began to appear, and, to counteract its effect, various substances were applied to the soil, in addition to careful and severe pruning and thorough cultivation. The first application was stable manure, but while this seemed to benefit some of the trees, some of them failed to come to time. The next thing used was the sweepings from a blacksmith's shop, which contain, in addition to droppings from animals, many hoof-parings and iron-filings; these were, perhaps, rather more beneficial than the first material used. About this time, under the direction of Dr. Goessmann, special fertilizers of various kinds were applied, and, by repeated experiments, it was found that bone and potash, with a little magnesia, gave the best results. The amount of each of these materials recommended was, as follows:

400 lbs. (50 lbs. PO_5) of acid bone phosphate, 150 to 200 lbs. of Muriate of Potash, (100 to 150 lbs. potash,) and 100 lbs. of crude Sulphate of Magnesia per acre. This should be applied in the autumn, just before the ground freezes, or very early in the spring, and well worked into the soil for a space of from five to ten feet in diameter under the tree.

The amount of this fertilizer used, should, however, vary with different soils, and it will be found sometimes

necessary to add nitrogenous matter if the trees fail to make a satisfactory amount of wood. The result of the use of this formula is, that we now have trees that are fifteen years old, that have borne five or six good crops of fruit, and are, at present, apparently in perfect health, although many of them have shown unmistakable signs of the disease, and recovered from it. The disease known as the Yellows with us, takes two forms ; first, a very active form, which often attacks trees that have been injured by the cold after seasons of late growth, and it requires but a few days to destroy the entire tree, except the roots, which often remain alive for a long time after the top is dead. The other, and most common form, is indicated by a yellowish, sickly look, during the entire growing season, and the premature ripening of the fruit. The fruit is always unusually high colored, sometimes the flesh is blood-red, and its brilliant color reminds one of the hectic flush on the cheek of the consumptive ; there is also often a bitter, unpleasant flavor to the fruit. This disease is always accompanied by minute uni-cellular plant-growths, similar to those found in blighted pear trees, or in fermenting ensilage, in fact, resembling those organisms that always accompany fermenting or decomposing animal or plant tissue. (This shows why we should not use raw manures.—J. J. BLACK.) The germs producing it are always found in its most active form, are very similar to those that accompany epidemic and con-

tagious diseases, like cholera, small-pox and diphtheria, etc., and do not generally grow and increase in tissue that is perfectly healthy. When the tissues become weakened from any cause, the proper conditions are produced, the germs found everywhere begin at once to develope, taking up the food that would otherwise go to the nourishment of the tree, and the result is the destruction of the latter.

Among the causes that may bring about this weakened condition, are, first, a late, immature or soft growth, which, upon exposure to severe cold, is so injured that the very unstable elements of which the tissue is composed, break up quickly, and fermentation begins, or, in other words, a very rapid growth of the bacterial cells, or germs, takes place. In some cases the tree is killed very soon after warm weather sets in, or, if less injured, decay goes on more gradually. Another cause of weakness may be found in the exhaustion of the soil, by the plant-food being all taken up by the roots, which are gross-feeders, and fermentation may result from the cells being in an inactive condition.

Exhaustion of the plant may also result from overbearing, when the cells are not only exhausted, but the plant-food of the soil is so reduced that the supply is insufficient to keep up a healthy action. Perhaps the greatest factor in the weakening of the tissue is the peach-borer. This insect is so well known that I will

not stop to describe it, but merely mention some of its habits. The eggs are laid upon the trunk, from close to the ground to a height, perhaps, of two or three feet, and, especially in old trees, in the forks of large branches. The eggs hatch and the larvae or worms feed upon the inner bark and sap-wood, eating a space of the size of a silver dollar. As many as ten or twelve have been found in a single tree, and this cause alone is sufficient to account, in a great measure, for the thoroughly exhausted condition of many trees. In order to better understand the nature of this disease and its effects upon the tree, let us glance at some of the functions of the tissue of the plant. In all plants the principal part of the plant-food is prepared or transformed, so as to be in condition to nourish the new growing cells, in the leaf. During the day-time, and under the influence of light, the plant-food taken in from the atmosphere and the soil is being rapidly transformed into starch in the green part of the leaf. At night, when the plant is in active growth, this starch is changed into sugar, and it is in this form that it is taken up to nourish the growing tissue.

Now it is found in diseased trees that there is a large quantity of starch undissolved in the tissues, and that the latter seems to have lost the power of transforming it into the proper condition for its nourishment, just as the sick man, although he is able to take large

quantities of food into his stomach, yet the system cannot make use of it and it becomes a still further source of disturbance. (This may happen in over-fertilized trees as well as in diseased or starved trees.—J. J. BLACK.) In looking for a remedy for this diseased condition, we would select those elements that are supposed to have an especially stimulating effect upon the diseased organs, and we find that potash possesses the property of increasing the vigor of the leaf-action of plants.

The muriate of Potash is generally thought to be the best and it is possible that the chlorine it contains, which is so destructive to animal and plant life, may have an antiseptic influence, preserving the contents of the cells from fermentation and decay, or it may destroy the germs within the cells. The way the remedy effects this favorable result, however, is somewhat a matter of conjecture, but the above seems a reasonable explanation. Iron is known to have a very beneficial influence upon the development of the green coloring-matter of the leaf of plants, and may generally be applied in small quantities with good results. Potash alone has the effect to cause rather a late growth, and this effect must be counteracted by the use of phosphoric acid found in the common super-phosphates, or in a less soluble form in ground bone—which has the effect of causing an early maturity of plant-tissues. The Magnesia is recommended to assist in the diffusion and retention of the potash in the soil.

It is claimed by many that this disease is contagious, and some go so far as to say that it often spreads in the direction of the prevailing wind—others claim that it has been communicated from one tree to another by dragging a diseased tree through the orchard, and by the pruning-shears or the knife. Now, while I have no positive proof that the disease is not contagious, I do seriously doubt that any one has positive proof that it is ; certainly, I have never seen such proof stated. Probably, in most of the cases where the disease is thought to have spread, the conditions of soil, atmospheric changes, etc., being the same, all the trees, sooner or later, will die in the same manner. I have seen in the same orchard, trees standing in the more moist, rich soil die after only a few years growth, while on the higher, lighter and poorer soil they lived many years longer.

I have in mind another instance : A lot of trees of the same age and variety, and from the same nursery, that were planted on soil apparently of the same nature ; the land was divided into two lots, one being seeded to grass with oats, while the other was cultivated with some hoed crop.

The first lot of trees which were robbed of the proper amount of food and moisture, died in a year or two, while those in the cultivated land kept up a fine healthy growth for several years, and produced some very

fine fruit. Now if the disease is contagious, why did they not all die in the latter case; or in the former, why should the difference in the soil make a difference as to their length of life? The above examples indicate that the condition of the tree determines its susceptibility to take the disease, and that the condition of the soil often exerts a very great influence upon the strength of the tree to resist or overcome the attack of fungous growths. We believe this to be true of all trees or plants that are subject to the attack of mildews, blights, etc., that they are never attacked until they have in some way become weakened. There are many cases of isolated trees in Massachusetts, that have reached the age of twenty years or more, under apparent conditions of neglect, but upon close examination, it has been found that their surroundings and the soil in which they were planted was such as to produce just the right kind of food, and that in just the right quantity to produce the best growth. Whenever a tree dies in our orchard, we plant a new one at once, and have never known the second one to die, although some were planted eight or ten years ago.

The special treatment our trees have received in the way of pruning, has been to cut all the new wood back, about one-half each autumn or winter, and to thin out some of the weak wood entirely. To overcome the tendency of the trees to form long straggling branches, after

a time some of the main branches are cut back to stubs a few feet long. From these, strong new shoots are produced, keeping the trees in good form. When the trees show indications of the Yellows, the whole top is sometimes cut off in this manner. The effects of this annual pruning are two-fold; to keep the trees in compact form, and to reduce the number of fruit-buds, thus lessening the danger of injury from over-bearing. A year ago this winter, we cut the tops of all the trees of this orchard back to stubs, varying from about two feet at the sides to perhaps three or four feet in the centre so as to give them good form, and the result has been the formation of very handsome heads of strong healthy new wood. All the ends of the branches were cut off, and after becoming well dried, were covered over with two coats of linseed-oil paint. The cultivation of an orchard so as to keep the trees in the best health and productiveness, we find the most difficult problem, and we are uncertain whether the land should be cultivated or not. (There is no doubt about the necessity of cultivation on the Peninsula.—J. J. BLACK.) The great advantage of cultivation is that it is perhaps the best way of supplying the necessary amount of plant-food, and of preserving the moisture in the soil, but I am very certain that trees in cultivated land are much more liable to be affected by the unfavorable changes of our climate, than when the roots are in turf. If grown in turf, we have two

very serious obstacles to overcome. The first is the loss of moisture by its evaporation from the grass and leaves, and the second is, the difficulty of supplying plant-food enough to support both trees and grass. Both can be overcome by the use of the grass as a mulch. If this is not sufficient, other coarse material, as brakes, moist grass, decaying brush, machine shavings from planing-mill, etc., may be very cheaply obtained. I am quite satisfied that if plant-food, to the value of the cost of labor for cultivating, be added to the soil annually, with the method of preventing the loss of moisture by mulch, our peach orchards will live longer and produce more fruit. Should it be decided most advisable to cultivate the orchard, care must be taken not to injure the roots by too deep working of the soil, and not to cultivate after August first. In case of the use of mulch, it should be removed from the immediate vicinity of the trees and piled up, about September first, to prevent a late growth of the tree, and to cause a ripening and hardening of the roots. Then if the trunks of the trees are protected from mice by a mound of earth, it may be put back again just before the ground freezes, to prevent injury to the roots from the cold. If an early starting of the tree is desired, the mulch may be removed as soon as freezing weather ceases, or if a late starting is desired, let it remain. But by whatever system of cultivation the orchard is managed, the orchardist must know the

exact condition of every tree, at all times, and be able to supply any need, or force them to do what is for their best growth. In order to do this, a man must have a love for his work and be thoroughly in earnest. Such men only will succeed in this business. I have known peaches to stand a temperature of eighteen degrees below zero when in a perfectly ripened growth.

In reviewing the subject, I draw the following conclusions. The peach tree is by nature a delicate tree, and sensitive to the sudden changes of our climate ; that many causes are at work by which the trees are still further weakened, and only when weakened are liable to the attack of the disease, known as, " the Yellows ;" that this disease may be largely prevented by cultivation and fertilization ; that diseased trees may be so treated as to recover and produce good fruit ; that there is no royal highway to success in the cultivation of this fruit, but that eternal vigilance is the price of an abundance of Peaches.

FROST.

Cold weather under certain conditions, probably, is the great cause of disappointment in peach culture. It comes unheralded, and as a rule, we are powerless to prevent its injuries, or stay its ravages. When the thermometer on the Peninsula drops to zero or below zero, the peach is in great danger, not only the buds, but the new wood, and even the larger branches ; six

degrees below zero, by experience has proved disastrous to the coming crop, and this has been so universally the case, that we look upon that mark on the thermometer as registering the death-blow to the yield of the coming season. Now, as to this matter, there are many attending circumstances to be taken into consideration. If the previous season's growth of wood has been a favorable one, if the fall has been one in which the growing bud flourished, and neither too dry nor too cold, so that the wood and buds be neither stunted, nor soft and flabby, the season up to December closing thus favorably, this wood and these buds will stand low temperature much better during December and January, than had the wood and buds opposite qualities from these mentioned. Six degrees below zero will not injure strong buds and strong wood, as much as zero weather will injure weak buds and weak wood. What the peach wants is weather that is equal in temperature, and the model season is a winter neither too warm nor too cool, and a like spring not opening too early. Peaches are, probably, most frequently injured in the spring, just when the blossom is shedding its leaves, leaving the young peach exposed, and as this happens at different periods in the life of the young peach, depending whether you are south or north on the peninsula, it accounts for the crop often being killed in the southern part, and saved in the northern part, or this may be reversed. I think it is about from

three to five days that the young peach is in this tender, unprotected state, and this is about the difference in ripening between the upper and lower orchards of the peninsula, and so the same frost may strike the buds below in their unprotected state, whilst those in the upper region of the peninsula may escape injury, not having progressed to the unprotected state. The peach is very warm blooded, and very little coquetting with warm weather induces it to leave its winter home. Hence, warm spells the latter part of January and in February, or even in March, cause the sap to rise, and the buds to swell, and a cold snap following, destroys vast numbers of buds, and weakens the bearing wood. I am satisfied that many orchards are thus deprived of their season's fruit. Late spring frosts, especially with moisture, often destroy the crops, especially when they catch the young peach bare. The peach at this time even, will stand a good deal of dry cold, but moisture with freezing does the damage. An easterly storm with cold rain at the blossom-shedding season, is a serious evil, and I have known the crops thus much reduced. After the leaves come out, for the tree blossoms before it has leaves, the young peach is safe except the frost be severe, and accompanied by moisture. Of course the better condition the trees are in, the better they can withstand cold. To sum up, the peach-tree wants a winter of medium temperature, especially one free from

the extremes of heat and cold, and followed by a backward spring, with equal temperatures. Particularly disastrous to the crop on the peninsula are, warm spells in February and March, followed by early spring and variable weather. As to protection against frost, I am satisfied that by smudges, the temperature in the parts affected by the smoke, can be reduced from one to three degrees, but I do not look upon them as practical in large culture, yet they may do good if applied to a given limited number of trees.

The effect of frost on the bud is easily seen when it has destroyed its vitality—cut open the bud longitudinally with a sharp knife. If it is alive and healthy you see the well-defined embryo peach, a little more shaded in very light green than its outer surroundings, with the very centre still a little darker green. This is a healthy bud. Should the frost have destroyed its vitality, this little centre shows itself as a dark blue or black speck, larger or smaller as the case may be, but the smallest indication of a dark centre indicates the certain death of the fruit. Through the late autumn and winter, a good prognosis of the crops can be made by going through the orchard, cutting many buds, and taking the percentage of those injured. If the twigs and small branches have been injured by cold, of course they shrivel and the sap never reaches them.

THE CURLED LEAF

exists now and again in orchards, but I can't say that

it has done damage to the trees or to the fruit. Like the yellows, it is probably bacterial in its origin, and is most apt to come where the trees are on wet, heavy land, and in warm, wet seasons. It comes in May, generally, or in June. The leaves swell and curl and are thick with puffs of a reddish color on the upper side, and of course the opposite side follows the puff, and is hollow. They drop off in about three weeks and new leaves come and take their places, and the tree apparenrly forgets the trifling annoyance. Under draining and surface draining and proper culture will eradicate, in a great measure, this trouble. As we most frequently see *curled leaf* after a warm, wet spell followed by clearing, cooling weather, I venture the conjecture that it is caused by a fermentation in the leaf during the phases of the starch changing to sugar, caused by the increased presence of bacteria which revel and increase prodigiously in just such changes of temperature. This fermentation causes the curl and death of the leaf.

THE JUNE DROP.

After the young peaches have well formed on the trees and are ready to start on their voyage to ripening, nature comes in, and here in a very marked manner asserts her sway in declaring that only the fittest shall survive, and hence, all those specimens of fruit that have not the perfect form of health, those specimens in which the early germ was in any way deteriorated by disease

or accident, yield to this inexorable law of existence in all that pertains to life on earth, and drop from the trees. This dropping is termed among growers, the June Drop or June Fall, and occurs on the Peninsula always, or almost always, in the month of June, depending somewhat on the earliness or lateness of the season, but is generally over by the twentieth to the twenty-fifth of June. Until this June Drop has past, it is impossible to accurately estimate the coming crop, but after it is over a very correct estimate can usually be made, the curculio and the elements being about the only disasters to apprehend after this time.

THE BORER.

The pernicious borer which has proved very destructive to the peach in the United States, according to Harris, whose description of the insect I give, is a species of *Ægeria*, named *Exitiosa*, or the destructive. Mr. Say first described it in the Journal of the Academy of Natural Sciences of Philadelphia. The eggs from which the borers are hatched are deposited in summer, on the trunks of the trees near the roots, or higher up, or even in the crotches of large branches. The borers penetrate the bark and devour the inner bark and the sap-wood. We know the seat of operations by the castings and gum which issue from the holes. When these borers are nearly one year old they make their cocoons either under the bark of the trunk or of the root, or in the

earth and gum contiguous to the base of the trees ; soon they are transformed to Chrysalids and finally come forth the full-winged moth, and lay eggs for another generation of borers. This last transformation takes place, Harris says, from June to October, in Massachusetts ; on the peninsula, as early as the latter part of May, and as long as warm weather lasts, he thinks we have them ; although there are several broods produced by a succession of hatches, there is but one rotation of metamorphosis consummated within one year. Hence, borers of all sizes will be found in the trees throughout the year ; although it seems necessary that all of them, whether more or less advanced, should pass through one winter before they appear in the winged state. The winged insect as we see it in the orchard is like a wasp, in looks—at first sight. It is a four-winged, dark-blue moth. The male is smaller than the female, has all the wings transparent, but bordered and veined with steel blue, which is the general color of the body in both sexes. The feelers, the edges of the collar and shoulder covers, the rings of the abdomen, and the brush on the tail are pale yellow, and the shins have two rings of yellow color. It expands about one-inch. The female has the fore-wings blue and opaque ; the hind wings transparent and bordered and veined like those on the male, and the middle of the abdomen is encircled by a broad orange-colored belt. It, the female, expands an inch and a half,

or more. They don't do much damage when deposited in the crotches of limbs, but often completely girdle the trunk. Harris recommends removing the earth from the base of the tree, and crushing and destroying the cocoons and borers which may be found in it and under the bark. Cover the wounds with wet clay and surround the trunk with a sheet of sheathing paper eight or nine inches wide, which should extend two inches below the level of the soil, and tie above. Fresh, wet clay should then be put around the roots so as to hold the paper and prevent access beneath it, filling up with new loam. Do this in the spring, or in June. Next winter remove the strings and next spring again examine the trees for borers and renew the protecting application. Heretofore, on the peninsula, we have merely had to destroy the borer by scratching around the trunks of the trees, and in the earth around it, and hooking him out wherever found ; destroy him, and also destroy all cocoons, and scratch out suspicious looking places in the bark. This is all that is necessary now, but we don't know what may come to us, and to be forewarned is to be forearmed ; for this reason I have given Harris' method of destroying them. From what we have said of the worms, it will be seen that they may be present all through warm weather, and you must begin to watch for them in June and on through until frost. Whenever you see gum or saw-dust about the body of the tree, or in the crotches of large

branches, but more especially near the ground, hunt for the borer and pull him out and destroy him by any method you can command ; by a knife blade, a piece of wire, your finger, or a stick, or what not. Clean the hole and bark about it, stuff up the hole with common soap, or with the common carbolic soap of the shops, or soft soap, and soap the bark of the tree, or apply a tree-wash. In this way, and in this way only, can you get rid of this pest. Maj. B. T. Biggs says, gas lime is obnoxious to the borer and a quantity may be spread around the tree. Young trees should be especially watched, and their bark kept clean. In warm weather have them gone over once or twice, and rubbed down with a coarse cloth, or a broom or brush, and in this way you will keep them free with little trouble from worms, and have a healthy orchard as it gets older. *Thrips*, which Harris rather places among bugs, but which may be the European (*Aphis Persicæ*) Peach-Louse. They draw large quantities of the sap from the leaves from numerous punctures, and disarrange the functions of the leaves, and hence, the food of the tree, and again thus injure not only the crop of fruit, but the tree itself. They make reddish tumors on the leaves which naturalists, according to Harris, call galls—because they resemble those formed in the same way, as in oak galls. These tumors on one side, and hollows on the corresponding opposite side make it look like curled

leaf, and this may be, or really is, one cause of curled leaf, but another form exists as has been previously described ; the leaves thus affected drop as other curled leaves. Soap-suds, or soap-suds and tobacco, sprinkled on the leaves will destroy these pests. Insectivorous birds will destroy them. Fruit growers, spare the birds when possible. Plant some cherries and such, for them, and they will work for you when all fruit has gone, and before it comes.

BARK-LICE—(*Coccidæ—Harris.*)

These infest the bark of the peach tree to a certain extent, but the peach has not yet suffered as the apple has in this country, but, if the peach continues to be grown much longer, all these pests will attack it, for what ever lives in this world has enemies which cause life to fight its way, and whilst on the peninsula we have no scientist to tell us of these things, to forewarn us and give us remedies, our trees may be overwhelmed at any time. A favorable place to find bark-lice of one species is on the powder-willow, and in summer if you sit under one of these trees thus infested, you will soil your clothing with a dye of a cochineal color, which comes from the juice of the crushed bugs, and is, I suppose, a really very good cochineal dye. These bark-lice live on the bark of the tree, roots and limbs, and are found again on the leaves. They are scaly, male and female, and increase rapidly. They live by suction from

the bark and leaf-stems of the tree. Harris believes the male and female pair in the autumn, the male perishing, and the female surviving the winter; this study he made on the apple *aphis*; the following spring the female lays her eggs. He says that after the meeting of the sexes the body of the female increases in size and becomes convex, and now serves to shelter the eggs. The eggs, when matured, pass under the mother's body, and this shrinks, gradually, until nothing is left but the dry outer convex skin, when the mother dies and the body protects the eggs until hatched—and if not large enough a kind of down is thrown out, which completes the covering. Birds destroy these lice, and they are also destroyed, Harris says, by parasites within them. The best wash to destroy them, Harris gives as follows: Two parts soft soap and eight parts water, with lime enough to make a thick white-wash; work thoroughly into the crevices of the bark and parts affected.

CURCULIO.

The Curculio, according to Dr. S. Kneeland, is a small beetle. The perfect insect is one-fifth of an inch long, dark brown, with white, yellow, and black spots. Shaken from a tree it feigns death and looks like, merely, a dried bud—it has a curved snout bent under the thorax when at rest, which is the instrument with which the curculio makes the crescent-shaped puncture in the fruit and in which it deposits the egg—the jaw is at the end of

the snout—the thorax is uneven, and the wing-cases are rigid and humped, covering two transparent wings by which the curculio flies from tree to tree. Behind the humps is a yellowish-white spot; each thigh has two small teeth on the under side. They appear on the peninsula between the first of April and the first of July, it depending on the forwardness of vegetation when they commence to appear. When the peaches get to be the size of cherries, the female goes from peach to peach, makes her half-moon shaped cut, and deposits one egg. She continues until her store is exhausted. The grubs are hatched by the heat of the sun, and resemble white maggots with a light-brown head; they immediately burrow obliquely to the stone of the peach. The fruit thus weakened, becomes gummy and drops prematurely Now the grub, full-size, leaves the peach on the ground and goes into the ground becoming a pupa, (chrysalis,) and in three weeks comes out a full-grown curculio; so its wheel of life goes around.

In full, or even moderate, bearing years, the curculio, while very active, doubtlessly, does not make much impression on the crop, but when the yield is light, at the beginning, the damage done by this pest, I have no doubt, is a very serious one. When you are going through your orchard in early warm weather, and see a small, brown object, like an elephant in miniature, suck at a small peach on the tree, that is the female curculio

depositing her egg. Remedies for curculio are, to jar the tree with a wooden mallet, by a series of quick, smart taps on the trunk and limbs, and shake it, and thus many of the females will fall to the ground whilst in the act of depositing their eggs, and may be caught on any object, like a white sheet, and destroyed. Scatter air-slacked lime over the tree, as soon as you see the fruit appearing, once a week, for six weeks. Use flowers-of-sulphur several times in the same way, or put it in white-wash with a little glue in it, and throw over, or spray the trees with any of the syringes or pumps now in use. Burn all fallen fruit, and cut out and burn all excrescences growing out of the trees, as the eggs may be deposited in these. See Harris on Insects injurious to Vegetation, and American Cyclopedia, from which I have, in a large measure, taken these descriptions.

As enemies to the peach, we have, again, rabbits and mice, and especially are these pests serious among young trees planted in new ground, or in ground that has not had the vegetation turned under before planting the trees. In such ground, many trees will be girdled and lost, especially in a hard winter. The remedies are, to tramp frequently about the trees when snow is on the ground; shoot the rabbits, and run them frequently with dogs, and put tar paper about the trees. Keep your orchards clean, and these animals will seek more congenial pastures. Sultry weather in picking time is

often a serious embarrassment, and thus many peaches soften down and are lost, but the remedy is to increase your force, to hurry off those coming to perfection, and to use your evaporator freely, if you have one. Such drawbacks, together with wind-storms. hail-storms and such like, we must take as visitations sent by God, and the nearer we can receive them in the spirit of Goldsmith's Vicar of Wakefield, the nearer will we approach human happiness, in respect to peach-growing, at least.

Chapter VI.

VARIETIES OF THE PEACH FOR THE PENINSULA.

In speaking of the varieties of the peach, there are numerous specimens of the great number existing that I will not even name, for I am writing for this locality. and shall confine myself to those varieties that flourish here. The general varieties, including seedlings, run far into the hundreds, but it is only tested or promising varieties, that we have to deal with.

The different peaches may be separated ; first, according to their colors, yellow and white ; secondly, as freestones and clings ; thirdly, by their leaves, different serrations, etc. ; fourthly, by their blossoms, form and color of, etc. ; and lastly, by the appearances of the trees, and by the presence or absence of glands of different kinds on the leaves, as globose glands, kidney-shaped glands, and by the absence of glands, etc. I have prepared the following list of peaches, which will thrive on the Peninsula with, probably, greater luxuriance, than on any other spot in the known world. Some of these, of course, will thrive better than others, and some will be found to be grown with little profit, and

others, again, will be found very profitable. From these last, of course, it will be our policy to make the final selections for orchard-planting for profit.

Early Alexander,	Fleitas or Yellow St. John,
Amsdens June,	Troths Early Red,
Early Beatrice,	Mountain Rose,
Early Louise,	Large Early York or *Honest John,
Early Rivers,	
Hale's Early,	Foster,
Crawford's Early,	Reeves Favorite,
Wager,	Moore's Favorite,
Old Mixon,	Crawford's Late,
Christiana No. 1,	Pullen,
Susquehanna,	Ward's Late Free,
Stump the World,	Bequette Free,
Sallie Worrall,	Fox's Seedling,
Golden Beauty,	Stephen's Late,
Shipley's Late Red,	Brandywine or Prize,
Variegated Free,	Smock,
Beer's Smock,	Wilkins' Late Heath Cling,
Townsend's Late Yellow,	Last of the Season,
Townsend's Late Red,	Keyport Late,
Salway,	Crocketts White,
Allen's October,	White or Late Heath,
Bilyeu's Late October,	Christiana No. 2,

* There is also a yellow "Honest John," coming in with Crawford's Early and much resembling it, though of a more pyriform shape. It will, in many orchards, be found substituted for Early Crawford's.

Mary's Choice,	Magnum Bonum,
Geary's Hold On,	President,
Brown's Choice,	Wheatland,
Henrietta (Cling.)	Kilborn or Canada Iron Clad.

Some of these peaches are not familiar to me, but when they are endorsed by such experts in the propagation of trees as, E. R. Cochran, J. G. Brown, and E. A. Ely, I willingly give them a place. They are not given in the order of their ripening; that I will give as near as I can in a table, showing the ripening of peaches.

Early Alexander—White.—Ripens last of June to first of July, depending on its location north or south on the peninsala, as will be the ripening of all peaches here described. The best of the very early peaches.

Amsden's June.—Much like Early Alexander, but if any difference it is inferior to it.

Early Beatrice — Reniform Glands. — Mottled-red cheek, etc., small, inferior, and not worth growing.

Early Louise—Reniform Glands.—Larger than Early Beatrice, but I do not recommend it. None of these early peaches carry well, are very tender, both tree and the fruit, rot badly, especially if weather is wet and warm at ripening time.

Early Rivers—Reniform Glands.—Large, good peach; pale straw-color; the best of the early peaches,

and desirable to plant, especially on lower part of the peninsula, on light, sandy soil.

Hale's Early.—Has no desirable qualities ; what it had having been supplanted by better varieties.

Fleitas or Flaters or Yellow St. John.—Large, round orange-yellow peach, good color, good flavor, and a peach, as far as I can find out, I am inclined to recommend freely.

Troth's Early Red — Globose Glands. — Regular bearer, but small. First class to evaporate, and I think some should be planted, where we have Evaporators, and especially in lower part of the peninsula. Ships well, and gives beautiful red centres after evaporation. Is a white peach.

Mountain Rose—White,—and one of the best of its date. Resembles the Early York.

Large Early York, or Honest John—Glandless, with serrated leaves—White.—A very good peach. This species is larger than the old Early York, but has less of the delicious Early York flavor.

Foster—Yellow,—and said to be a very fine peach ; is being largely planted, and is highly recommended. Ripens just before Crawford's Early, and said to be a better peach.

Crawford's Early—Clobose Glands.—Get the true old-fashioned Crawford's Early, and not the Yellow Melocotoon, which is most often sold for it, and you get a grand, early, yellow peach.

Wager—Globose Glands.—Good sized, lemon-yellow peach which originated in New York state and is highly spoken of there ; said to reproduce itself from the stone every time ; said to withstand frost well. I have fruited it in my garden. Here, it is a very prolific bearer and a strong rapid-growing tree. The peach is juicy and of a delicious apricotish flavor, flesh straw-color, and skin dotted with reddish-brown spots and often a handsome red blush. In field-culture, I think, will ripen with us after Early Crawford ; I have budded and planted several hundred in my orchards, and believe it will be a success as a producer of fairly large, and good looking, well flavored fruit, and will be a regular bearer.

Reeves Favorite—Globose Glands.—Yellow, and one of the grandest of peaches, but, like all extra large ones, a shy bearer and producer. It does better in some places than in others, and is a far better producer than Susquehanna or Pullen. I dont want too many of them for profit.

Old Mixon—Globose Glands.—White, elegant to ship, with beautiful blush, and altogether desirable for profit. In flavor it is facile princeps among peaches.

Moore's Favorite—Globose Glands.—Like the above, but not so free a bearer. Ripens a day or two before old Mixon. A grand peach.

Christiana, No. 1 and Christiana, No. 2.

Yellow Free-stone.—No. 2 the one to get if possible. Comes between Crawford's Late and Smock, and for this reason should be desirable if it should be a good bearer.

Crawford's Late—Globose Glands.—A grand, *Yellow* freestone peach, and is, and should be, in every orchard. Is profitable, even if a little shy at times, and tender as to frost. Plant it.

Susquehanna—Yellow.—A grand peach, but don't plant it. It is too shy a bearer.

Pullen—Yellow.—Grand, but if you want profit, I would not recommend it. It is shy, and is much the same peach as the Susquehanna. If you want to show your wares at the Fair, have some of these two peaches.

Stump the World—Globose Glands—White free-stone,—with beautiful color. One of the old reliables like old Mixon. Stump, next to Smock is, probably, the best peach to evaporate, and should be very largely planted.

Ward's Late Free—Reniform Glands—White free-stone,—and fine. I prefer Moore's, Mixon's and Stump,

to Ward's. Ward, more apt to shed its fruit, and is, for this fault, not profitable.

Sally Worrall—Freestone, *White.*—A North Carolina new peach, recommended to me by E. A. Ely, and that is a good recommendation.

Bequette Free.—E. A. Ely recommends it, and that is all I know about it.

Golden Beauty.—Same recommendation as Bequette Free.

Fox's Seedling—Globose Glands—White freestone.—Ripens at a time to make it valuable, and is productive, and is very largely planted on the peninsula.

Shipley's Late Red—Large, *White, Red Blush, freestone.*—Ripens about with Smock, and is highly recommended.

Stephen's Late—White freestone.—Ripens the end of September, and is highly recommended by E. A. Ely. It is a rareripe.

Variegated Free.—Introduced by H. R. Walker, Esq., of Middletown, Del. A seedling of the old Variegated Free. White skin, shaded and striped with red. A white peach, and is desirable.

Brandywine, or Prize.—Said to be larger than Crawford's Late, and, probably, a seedling of it. Comes

in with Smock, and this makes it desirable. I have a notion it is a little shy, and I know it does much better in the heavier soil of the upper Peninsula, than it does in the lighter sandy soil below. It will probably prove a very valuable peach.

Beer's Smock—Reniform Glands.—Plant plenty of this old reliable—second quality though it be—it brings profit to the grower. The best to produce weight after evaporation and canning. *Yellow freestone.* Quite certain, and a very prolific bearer.

Common Smock—Reniform Glands.—A little behind Beer's Smock in size, etc.; ripens a day or two before, and if anything, will stand more frost than its bigger brother.

Townsend's Late Yellow.—E. R. Cochran recommends it, and that is a good reason to plant it.

Townsend's Late Red.—The same comment applies to this peach.

Last of the Season.—The same with this peach.

Wilkin's Late Heath Cling—Reniform Glands.—*Cling*, and nearly double the size of White Late Heath Cling.

White Late Heath—Reniform Glands.—Not so large, but, probably, a better bearer than Wilkin's. These

peaches sell well for brandying, etc., but I don't think they are, as a rule, profitable orchard varieties.

Salway.—Rather small, late *Yellow* freestone. Fair to evaporate, and does best on light, sandy land.

Keyport White—White flesh, a free white seed. Jersey gives it 18 good marks out of a possible 30. Probably, we don't want many of them on the Peninsula, nor of

Crockett's White—Reniform Glands, either.

Brown's Choice.—J. G. Brown, of Camden, Del., says this is the best white peach, comes after Moore's Favorite, and is one of the best peaches, one of the best shippers, and one of the most profitable peaches he raises. There is no better authority than Jacob G. Brown, of Camden, Delaware.

Magnum Bonum.—Also recommended by J. G. Brown, and that is all I know of it.

President—Globose Glands — Red,—and very large and profitable. E. R. Cochran recommends it, and so does he recommend

Allen's October—Late—Free—Yellow.

Bilyeu's Late October — White—Free,— red cheek; very hard, but let it drop and lay on the ground ten days and it becomes a pretty good peach to eat.

Geary's Hold-on—Large—Yellow—Free.—Said to be a seedling of the Smock. Is late.

Mary's Choice—J. G. Brown recommends it.

Henrietta.—The late Randolph Peters called it the most magnificent yellow cling known. Large ; mostly bright crimson ; hardy ; sure bearer and productive. It brings fancy prices.

Wheatland.--E. A. Ely recommends it for the Peninsula, but personally I know nothing about it.

Now we come to one of the most important points in peach culture, viz : The selection of the varieties for the orchard. It is a great mistake to have too many kinds, even in a large orchard, and it is necessary to watch the progress of the business, for what might have been profitable several years ago, may not be profitable now. For example, the improved means of transportation is throwing the southern fruit into the northern markets, and they compete with the early fruit, and take all the edge off of buyers before we can get ours in from the peninsula. Next, canning and evaporating have measureably increased, and it is necessary to take this into consideration, and plant with these interests in view, and, especially if we have large establishments of this kind near us, plant for their especial needs. Then, by observation and inquiry, see what does best in your neighborhood, and I assure you that this is important,

for the same peach may act differently even on adjoining farms, or even fields. Study the peculiar soil that each variety demands. Before you plant, decide whether you will plant particularly for canning, or evaporating, or for shipping, or, will you combine all? If you have a retail market near you, and wish to retail, particularly if your orchard is small, study well the demands of this market. In my own orchards, of over ten thousand trees, I don't think I have over six hundred trees coming in before Mountain Rose; and had I to plant them to-day I would not have that many, situated as my orchards are, north of Wyoming.

In the answers to my questions sent out to some of the most intelligent of our peninsula fruit-growers, will be found their views on the varieties to plant in an orchard of one thousand trees, and now I will give my own views on this subject.

For an orchard of one thousand trees, with a view of selling to dealers in a near market, as Wilmington, for instance, or of retailing the fruit in such a market, it being within driving distance of me, I would plant as follows:

Yellow.		*White.*	
Early Rivers,	10	Mountain Rose,	100
St. John,	20	Old Mixon,	150
Foster,	100	Moore's Favorite	100

Wager,	25	Stump the World,	150
Reeves' Favorite,	20	Shipley's Late Red.	50
Crawford's Late,	100		
Brandywine, (or Prize,)	50	Total white,	550
Beer's Smock,	100		
Wilkins' Late Heath Cling,	25		
Total yellow,	450		

Now the reader may say, here are too many varieties; but recollect it is for a retail orchard, near Wilmington or other large towns. The varieties are all good, of the kind demanded here, and will give a succession of fruit from the beginning to the end of the season. If the grower choose he may cut it down by eliminating such as Wager, Reeves, Brandywine, and Shipley's Late Red, and substitute for them, additional Crawford's Late, Beer's Smock and old Mixon, but in my opinion he will diminish his chances of always having fruit.

For an orchard of one thousand trees south of Wyoming I would plant as follows:

AN ORCHARD OF ONE THOUSAND TREES SOUTH OF WYOMING.

Yellow.		*White.*	
Early Rivers,	50	Troth's Early Red,	25
St. John,	25	Old Mixon,	175

(NOTE.—In large orchards never plant a few peaches of one variety unless for experiment. Less than fifty trees of one variety are a nuisance if you have five thousand trees or more.)

Crawford's Early,	50	Moore's favorite,	100
Foster,	50	Stump the World,	200
Wager,	25	Fox's Seedling,	75
Beer's Smock,	150	Shipley's Late Red,	50
Salway,	25		
		Total White,	625
Total Yellow,	375		

I put in Salway here because it is a peach for light, sandy soil, and will do best of these late peaches, but I don't fancy any of them greatly, because the edge of the market is gone, they are not sought for,and the northern peaches are so much better in the varieties they send at this time. Probably, Shipley's Late Red would pay better than these 25 Salways.

FOR AN ORCHARD OF ONE THOUSAND TREES AROUND WYOMING AND DOVER.

Here we need good shippers, good evaporators, and good canners—and have a soil combining most of the advantages to grow them in. For this region I give the list of Jacob G. Brown, of Camdem, with a slight modification from the list of Dr. Henry Ridgely, of Dover. I know of no better authorities on peaches anywhere, than these two gentlemen.

Yellow.		*White.*	
Early Rivers,	25	Troth's Early Red,	25
Foster,	25	Old Mixon,	100

St. John,	25	Moore's Favorite,	50
Crawford's Early,	50	Stump the World,	150
Christiana, No. 2,	25	Fox's Seedling,	100
Crawford's Late,	75	Variegated Free,	25
Brandywine or Prize,	25	Shipley's Late Red,	25
Beer's Smock,	100	Wilkin's White Heath Cling,	25
Geary's Hold-on,	25	Temple's Late White,	25
	——	Brown's Choice,	100
Total Yellow,	375		
		Total White,	625

Here are nineteen varieties, a good many, truly, but in this hive of peach industry, we want the fruit at all times, and under all circumstances, to eat, to can, to evaporate, to ship, and it must possess qualities for all these purposes. I have increased stumps here, for it is a grand peach to ship, to can, and next to smock, the best to evaporate, and is profitable in any way you can take it; it is a good and regular bearer, and, oh, such a pretty peach to look upon. You will notice in this list that the white fruit slightly predominates. I believe this is as it should be, for profit. It is more sure in bearing, standing the frost better. It is grand fruit to ship, to can, to evaporate, and to eat. Perhaps, to-day, the yellow fruit predominates on the peninsula, but I am a firm believer in making the division as to color, near or quite even, in order to facilitate the proper regulation of the business.

FOR AN ORCHARD OF ONE THOUSAND TREES NORTH OF WYOMING AND DOVER.

Yellow.		*White.*	
St. John,	25	Mountain Rose,	50
Crawford's Early,	25	Old Mixon,	150
Foster,	25	Moore's Favorite,	75
Wager,	25	Stump the World,	150
Crawford's Late,	100	Fox's Seedling,	100
Brandywine or Prize,	50	Steven's Late,	25
Beer's Smock,	150	Shipley's Late Red,	25
		Wilkins' White Heath	
Total Yellow,	400	Cling,	25
		Total White,	600

Here I commence with Mountain Rose, because I think there is no profit or satisfaction in growing the extra early peaches in this district.

For a family orchard on the peninsula, I would recommend the following varieties, which will give peaches to eat all through the season, and peaches to can, peaches to evaporate, and for all kinds of preserves, pickles, etc.

A PENINSULA FAMILY PEACH ORCHARD OF ONE HUNDRED TREES.

Yellow.		*White.*	
Early Rivers,	2	Early Alexander,	1
St. John,	2	Troth's Early Red,	2

Foster,	3	Mountain Rose,	3
Crawford's Early,	3	Old Mixon,	10
Wager,	3	Moore's Favorite,	5
Reeves' Favorite,	5	Stump the World,	13
Crawford's Late,	5	Fox's Seedling,	3
Brandywine or Prize,	5	Shipley's Late Red,	3
Smock,	15	Brown's Choice,	4
Geary's Hold On,	5	Wilkins' White Heath Cling,	5
Henrietta Cling,	2	Bilyeu's Late October,	1
Total Yellow,	50	Total White,	50

TABLE SHOWING THE TIME OF RIPENING OF THE LEADING VARIETIES OF PEACHES GROWN ON THE PENINSULA.

Of course, neither this nor any other table of the kind can be absolutely correct, but I believe it will give the average time of ripening, taking, say, an average of five years, and will be a valuable table for reference. It is made out for the latitude of Wyoming, and for every ten miles *south* of Wyoming *anticipate one day*, and for every ten miles *north* of Wyoming, *add one day*.

Early Alexander, (White, Free), July 1 to 7.
Amsden's June, (White, Free), July 1 to 7.
Early Beatrice, (White, Free), July 15 to 20.
Early Louise, (White, Free), July 20 to 25.

Early Rivers, (Pale-Yellow, Free), July 20 to 25.

Hale's Early, (White, Semi-Free), Aug. 4 to 7.

Troth's Early Red, (White, Free, Red Centre Peach), Aug. 15 to 20.

Mountain Rose, (White, Free), Aug. 23.

St. John, (Yellow, Free), Aug. 25.

Large Early York, (White, Free), Aug. 25.

Foster, (Yellow, Free), Aug. 15 to 18.

Crawford's Early, (Yellow, Free), Aug. 15 to 20.

Wager, (Pale-Yellow, Free), Aug. 20 to 25.

Reeves' Favorite, Yellow, Free), Aug. 20.

Moore's Favorite, (White, Free), Aug. 23.

Old Mixon, (White, Free), Aug. 25.

President, (White, Free), Aug. 27.

Susquehanna, (Yellow, Free), Aug. 31.

Pullen, (Yellow, Free), Aug. 31.

Stump the World, (White, Free), Sept 1.

Crawford's Late, (Yellow, Free), Aug. 30.

Ward's Late Free, (White, Free), Sept. 1 to 2.

Christiana, No. 2, (Yellow, Free), Sept. 2.

Sallie Worrall, (White, Free), Sept. 1.

Fox's Seedling, (White, Free), Sept. 5 to 7.

Brandywine, or Prize, (Yellow, Free), Sept. 8 to 10.

Shipley's Late Red, (White, Free), Sept. 10.

Variegated Free, (White, Free), Sept. 12.

Smock, (Yellow, Free), Sept. 13.

Crockett's White, (White, Free), Sept. 14.

Beer's Smock, (Yellow, Free), Sept. 15.

Keyport Late, (White, Free), Sept. 18.

Stephen's Late, (White, Free), Sept. 20.

Salway, (Yellow, Free), Sept. 20 to 25.

Allen's Late October, (Yellow, Free), Oct. 1 to 10.

Bilyeu's Late October, (White, Free), Oct. 1 to 12.

Geary's Hold On, (Yellow, Free), Sept. 23 to 25.

Temple's Late White, Sept. 15.

Magnum Bonum, (Yellow, Free), Sept. 6 to 10.

White Heath Cling, (White, Cling), Oct. 1 to 5.

Wilkin's White Heath Cling, (White, Cling), Oct. 1 to 5.

Wheatland, (Yellow, Free), Aug. 30.

Henrietta, (Yellow, Cling), last of Sept. to Oct. 5.

Mary's Choice, (Yellow, Free), Aug. 20.

Bequette Free, (White), very large, and is productive, Sept. 1.

Golden Beauty, Yellow, Ripens near St. John, Aug. 18.

Lord Palmerston, (White, Pale Red, Large), very late, said to be sure and productive.

Arkansas Traveler, (White), Ripens with Alexander.

Bonanza, (White, Free), very large, 15 days later than Salway. Productive.

Kilborn or Canada Iron-clad, July 20 to 25.

Mrs. Brett, (White), Aug. 20, very large, and exactly like Old Mixon. Productive. Recommended as the best peach grown.

Onward, (Yellow), like Foster. Good color. Large bloom.

Topaz, (Yellow), large. Large bloom, sure and productive.

Early Beauty, comes about with St. John.

The time of ripening, as given in this table, is to be understood to refer to the time when the peach is in a fit condition to be gathered for shipping to distant markets.

TABLE SHOWING THE APPRECIATION OF THE QUALITY OF SOME OF THE LEADING VARIETIES OF PEACHES,

taken chiefly from the Reports of the New Jersey State Horticultural Society.

Name.	*Total No. of Merits.*	*Possible No. of Merits.*
Alexander's Early,	21	40
Amsden's June,	14	35
Early Beatrice,	7	25
Early Louise,	4	10
Early Rivers,	5	10
Mountain Rose,	54	55
Large Early York or Honest John,	35	50
Troth's Early Red,	26	45
Crawford's Early,	36	50
Foster,	15	20
Wager,	15	25
Wheatland,	8	10

Name.	*Total No. of Merits.*	*Possible No. of Merits.*
Mrs. Brett,	15	35
Stump-the-World,	52	60
Old Mixon,	59	60
Lord Palmerston,	18	25
Crawford's Late,	60	60
Fox's Seedling,	14	15
Steven's Late,	17	20
Keyport White,	18	30
Beer's Smock,	42	50
Salway,	19	45
Bilyeu's October,	11	20
Moore's Favorite,	25	35
Smock,	38	50
Brown's Choice,	43	50
Mary's Choice,	36	50
Magnum Bonum,	40	50
Brandywine or prize,	40	50
Golden Beauty,	30	45
Bequette Free,	25	45
Sally Worrall,	30	45

As I said before, many of these reports are taken from the New Jersey State Horticultural Society, and a few I have added in accord with my own opinions.

Chapter VII.

GATHERING THE CROP, OR PICKING PEACHES.

The crop having arrived at the point of perfection in growth, its handling now comes to be of the greatest importance, for on the picking of the fruit, taking it neither too hard, or too soft, from the trees, depends in a great measure, the condition in which it will reach the markets, and if this condition be anything but right, serious loss will ensue.

The trees being rather small, many of the peaches can be picked from the ground, but when they are too high for this method of gathering, the picker pulls down the limb with a hook, made, usually, from a forked stick of some tough wood, one side of the fork being cut off to about four or five inches long, and the other running out six or eight feet, to form the handle. This is used from the ground, or, if necessary, the picker mounts a ladder, or steps, called a peach ladder, and fills his basket, setting it on a shelf prepared for it, on the top part of the ladder. The wood of the peach is brittle and easily split or broken, and pickers ought to be

frequently cautioned to be careful to work gently, and to break or split as few limbs as possible. If you are picking for long shipments you must take the fruit fully formed, but hard. If for a near-by market, you may let it fill up more, and even show signs of ripening, but not softness. If you are picking for canners you want it full and ripe, but not soft, and, for the evaporator, you can use it hard, soft, or very soft. This evaporator is a great help to the grower, but equally as much the enemy to his pen of hogs. Formerly, the pigs got everything that could not be shipped. Now the evaporator has changed all this, and no part of the crop goes amiss.

I think, sometimes, many of our peaches are picked a few days too soon, for by letting them remain on the trees until a few drop, the remainder swell, measuring better, and the dropped ones go to the evaporator, so that, altogether, we get a better profit. Nevertheless, this getting the peach off the tree, at just the right time, requires great experience and good judgment, and, of the two errors, picking them too hard will be the least costly. The peaches are picked at random, in the orchard, as to size, but with care as to condition, and most varieties will require going over at least three times, on as many different days. As they are picked they are taken to the peach house, which may be a temporary structure in the orchard or near it, or to the farm-barn, or granary. Here they are sorted into grades, and the Del-

aware Fruit Exchange grades are the proper ones. No. 1, No. 2, No. 3, and fancy, or double extra. What are left after this sorting, goes to the evaporator, or the hogs, and, in seasons of great plenty, probably, No. 3 is not often profitably shipped. They are culled by hand, or by Jones' Peach-Culler. Peaches should be handled by hand, and never poured from one receptacle to another, when possible to avoid it, for hand-culled fruit always looks the best, but when the crop is large and help is short, the peach-culler will be found of very great use. When the peaches have been culled and put in their proper receptacles—baskets or crates—they are ready for the last touches, sprigging the tops (if baskets) with twigs and green leaves of the peach, or putting on wooden or muslin covers. We don't often cover any except "Fancy", and don't sprig any below No. 1, but a great deal depends on the demands of your intended market. The next step is to take the baskets or crates of peaches to the cars or boat. This should always be done in a spring wagon, and then you can drive as fast as peach men generally drive, and that is fast, I assure you. Loading them carefully, ends the active participation of the grower in handling his crop.

MARKETING THE CROP.

Here comes in the most responsible, the most perplexing, and often the most annoying part of this whole hazardous business. The peach is perishable,

swiftly perishable, and whatever is done with it must be done quickly or it will cease to represent value. This being the case, as with all other such merchandize, their handling is expensive, because the animals which bring them from the orchard must move quickly, the men who load them must move quickly, and the cars or boats that transport them, must have extra-quick dispatch. The whole business is done, as it were, on the run, and when one comes to investigate the difference between transporting a ton of freight an hundred miles, at the rate of fifteen miles an hour, and transporting it the same distance at the rate of forty miles an hour, he can appreciate, in some degree, why we are compelled to pay high prices for transporting our fruit. It is a grand and sure business to the transportation companies, but a very precarious one to the producer, this matter of seeking distant markets for our peaches, at high rates of speed. There is no shadow of doubt of one thing, that is, it is to the interest of the grower to sell his fruit at his railroad station or steamboat landing, or, in other words, it is to the growers interest to bring the buyer as near to him as possible and there sell him his fruit, and let the buyer ship to distant points, where he has his market well in hand, and has the choice of fruit to supply it. The grower has the advantage of personally supervising the sale, and has a share in making his prices; whereas, if he ships to commission men, be they ever so honest, he

knows absolutely nothing of the sale of his fruit in a hurried crowd and a distant market, over which he has not the least control. As to the buyer, he has great advantages, too. He deals with the producer, he gets his fruit fresh, he buys through the Delaware Fruit Exchange, or ought to, and has the benefit of inspection of the fruit by a sworn Inspector at the point he may happen to buy, and, above all, he sends his fruit to his market in good order with no re-handling or transshipment. "Bring buyers to your stations!" should be the rallying cry of the Peninsula Fruit Growers, and I sincerely believe that, to a man, they should take up the Delaware Fruit Exchange, elaborate it, and bring it to the perfection its enterprising originators are striving for. A successful shipment to Europe was made this year by one of the Messrs. Cochran, of Middletown, in individual crates, and I learn it was in every way successful. This would make a desirable outlet for fancy fruit.

THE DELAWARE FRUIT EXCHANGE

is a corporation of the State of Delaware. Capital $300,000. Capital stock, 30,000 shares, at ten dollars per share. W. H. Ridgeway, President; A. N. Brown, Secretary.

Its objects are, *first*, to bring buyers to the railroad stations.

Second. To secure and maintain confidence between buyers and sellers by providing for inspection of the fruit, and branding the same according to quality, as follows: "Fancy," highest brand; No. 1, second highest; No. 2, third highest; and No. 3, the lowest brand.

Third. To sell by auction to the highest bidder, for cash. For this sale, with inspection, the charge is one cent per basket, to be paid by the grower.

Fourth. The headquarters to be at Wyoming, Kent County, Delaware, with inspectors at such other stations on the Peninsula, as may be desired, or may be practicable; these branch inspectors to inspect and grade the fruit, and report it when so graded and inspected by the car-load, to Wyoming, when it is to be put up and sold by the car-load to the highest bidder, with the grade guaranteed by the Delaware Fruit Exchange. This is business, and there is absolute confidence guaranteed between buyer and seller; the profit and satisfaction to each can only be appreciated by those who thus transact this business.

Only stockholders can sell fruit in the Exchange, but a non-stockholder may sell his fruit through a stockholder, by paying the usual commission of one cent per basket.

The expenses of the Exchange are: pay for inspectors, for travelling agents looking up markets,

now and again, (this feature I deem very advantageous to the fruit growers,) their temporary headquarters at Wyoming, with such incidentals as printing, etc; certainly an economical corporation.

This year the Exchange sold, at Wyoming, fifty thousand baskets of peaches of the three hundred thousand baskets brought to that station. The fruit sold through the Exchange averaged $4\frac{1}{2}$ cents more per basket, than that sold outside.

The Fruit Exchange is a success, now, and will be more of a success when there comes a large crop and more fruit than buyers. This year, (1885,) there were more buyers than fruit. When the large crop comes, the Exchange will cause all to put up their fruit honestly, according to the brand, and this will cause the buyer to prefer the Exchange to buying from outsiders, who have no guarantee to their fruit by the Exchange inspectors, and *this inspection must be a cardinal point in Exchange-law*, if it is to go on prospering. A large station is an advantage, and Wyoming has this advantage. Her growers ought to sell their fruit there, and not ship it, and thus draw buyers; for there is more profit in the Exchange than in shipping. I am satisfied that had I had my own fruit at Wyoming station this year, and sold through the Exchange, instead of shipping, as I did, to Philadelphia, Newark, N. J., and New York,

I would have cleared at least thirty cents more per basket on my fruit than I did clear. This financial argument is strong enough for me to wish for the advantages of the Delaware Fruit-Exchange.

There are some things which operate against the success of the Exchange, and one is, the interference of the local middle-men; and again, all the farmers not selling through the Exchange; and again, the lacking, in some instances, of absolute good faith, or in other words, of strict honesty among the growers.

Use the Exchange, cultivate absolute good faith between buyer and seller and between growers; do everything to extend the Exchange to all points on the peninsula, and the whole thing will be a graud success, morally, physically and financially, and this new system of disposing of the products of our orchards, this grand purveyor of good faith between the buyer and seller, and between man and man, will add thousands of dollars, yearly, to the coffers of the good people of the peninsula; will raise a lasting monument to the good and true men who conceived it, and will be another round scaled by this Heaven-favored region, on the glorious ladder of modern progress.

The fruit not sold at the stations, or wharves, is shipped to the great market-centres, Boston, New York, Philadelphia and other points, and is sold by commission

men by the package. The commission men guarantee to return the baskets, report sales daily, and make returns weekly, charging about ten per cent. on the gross amount of sales. There is some fruit sold to local canners, evaporaters and traders, and by all these means combined is the crop disposed of. The best and favorite package is the standard $\frac{5}{8}$ bushel-basket, without top or cover; some of these are covered with muslin for fancy fruit, and some have wooden tops, which are rather a new idea, and enable the baskets to be packed without danger to their contents, and very closely.

Another package is the crate, of wood, $\frac{7}{8}$ bushel, with two compartments of equal size. These packages are used, principally, for the Baltimore market, where they are popular for some varieties of peaches. There are also small fancy baskets of one gallon, and six quarts, each; these are generally sent packed in a thirty-two quart berry-crate, and this holds eight gallon-baskets, and six six-quart baskets; these are only used for extra early or fancy fruit.

Chapter VIII.

CANNING THE PEACH.

Hermetically sealing, or as it is now commonly called, canning the peach, is a method of preservation very largely practised at present on the peninsula, and the peach is preserved with all its flavor, and other attributes wonderfully maintained. At a time when the ripe fruit cannot be got, or to those who are never able to get it, the canned peach is an admirable substitute.

There is much history in this word "canning," and as Trench would have followed out such a word, we might trace in it a good part of the history of fruit-culture on the peninsula. The first time I ever saw the process was in a frame building on the far side of the canal, in St. Georges, more than thirty years ago, where the late Dr. John H. Fromberger was engaged in putting up the fruit, and for the purpose used glass jars. He succeeded admirably in putting on the market a good article, and made large shipments to Europe, but his business methods proved defective, and he soon abandoned the enterprise.

I think he obtained his process from the heirs of a Mr. Smith, who had, in his life-time, been largely engaged in preserving and pickling various fruits and vegetables. From that date until the present the business has grown enormously, and some of our enterprising peninsula firms have trade-marks, which are worth a handsome fortune to their possessors. Glass and tin are both used for the package, but tin, in nine cases in ten, is the material employed. It appears to me to be a perfectly safe and healthy can. The contents are hermetically-sealed, all solder is placed on the exterior, and on the exterior only, in well regulated establishments, and there can be no poisonous substance developed where there is no oxydation. Where the can is air-tight there can be no oxydation, and if the can is not air-tight the contents spoil, and are thus rendered unfit for food. The question is often asked, how long can an article of food remain with safety in a tin receptacle, hermetically-sealed, and be safely used for food. I answer, one hundred years, if the can will remain intact that long. There can be no change in the contents without air entering the can, and when air enters the can, decomposition takes place, and this we soon find out by its physical properties, and would no more eat it than we would eat any other spoiled food. Food-supplies, hermetically-sealed, take no account of time. One hundred years to them, is no more than one hundred

days ; no change can go on in them, no fermentation can arise, for there can be no proliferation of bacteria, for there is no air present, no oxygen for the processes of oxydation ; hence there can be no reaction between the contents of the can and the tin, and hence, nothing injurious to health can be developed in tin receptacles of this kind, which are absolutely air-tight, and soldered entirely on the outside. I admit that glass is a more refined and a cleaner material for the packages, but the trouble is to hermetically seal it ; it is more costly, in the first place, and there is great loss from air entering, both in the hands of the producers, the middle men, and the consumers. The method of hermetically-preserving is simple, and the first requisite is absolute cleanliness in every detail of the business. The operators, the knives, all the utensils, the tables, the floors, the buildings, the grounds, must be kept scrupulously clean ; nothing should be allowed to ferment within a mile of a canning establishment.

The first step is to grade the fruit, then pare it and usually cut it in half, although some is canned whole. Then the fruit is put in copper-trays, and steamed in the steam-box ; this softens and wilts the fruit. The next step is to put the fruit into the cans or jars ; then pour over the fruit, hot syrup, of the proper density for the brand ; eight pounds of sugar to twelve cans is a heavy syrup. The cans, when full, weigh, usually, 3 lbs.,

and the usual guarantee is 2 lbs. 13 oz. The next step is to solder the cans, or stop the glass packages; the next step is stopping the vent, and finally, the receptacles are put in the bath and boiled. The bath cooks the contents to some extent and tests the package. A leak causes a bubbling, and those packages are taken out and repaired. The next process is labeling, and the last is the packing in cases for shipment. They are generally divided into white and yellow fruit, by the trade, and, as such, are labeled on the packages; it not being the custom to note the variety.

CONSERVES.

Peaches make delicious conserves. It is necessary to nearly half preserve them with syrup, then dry them on dishes,in the sun, covering them to keep off insects, and, when thoroughly dry, pack them carefully in pulverized white sugar. They will thus keep for years.

PEACH LEATHER.

Pare the peaches and seed them, and pass the pulp through a colander; then spread it thin on smooth boards or marble slabs, well greased with pure olive oil. Now dry in the sun. Eight hours hot sun will usually cure it. Then draw the leather from the board or marble, and cut it in shapes to suit; the best being strips three feet long by four inches wide. Sprinkle these strips with white pulverized sugar, and roll them up tight. It will keep a

long time. When finished it is really desiccated peach rolled in sugar.

PRESERVES, PICKLES, MARMALADES,

and many other good things are made from the peach, which are described in most of the works on cooking, to which, for information, the reader is referred.

PEACH-BRANDY.

A good article of brandy, which has its own peculiar properties, is made from the peach. Now while any brandy in large quantities is bad for a person, peach-brandy is said, on account of the prussic acid it contains, to be a very dangerous tipple if indulged in freely. Formerly, a considerable quantity was manufactured on the peninsula, but the stringent excise laws of recent years have caused most persons to abandon its manufacture. I would say to any friend going down the State as far as Georgetown, the fair capital of Sussex County, that a gentle whisper into the ear of our worthy Governor would produce such a sample of "Peach," as we, in the upper part of the State, scarcely wot of, and with the addition of a little peninsula honey and pure spring water, he would convey to his lips a compound which would reach further into the recesses of his inner man, than any nectar the Great Jupiter ever sipped. Otherwise obtained, I advise mortal man to be chary of this beverage. One indulgence is said to make one feel good.

The second makes one feel better, and the third makes him feel as though he owned the whole Delaware and Chesapeake Peninsula. But the next day—the awaking—ah, the awaking, surely, instead of owning the whole Delaware and Chesapeake Peninsula, he finds his possessions, (A friend at my elbow suggests, "except his head,") shrunken to a size Liliput might spurn.

EVAPORATING THE PEACH.

Evaporating, drying, or desiccating the peach is a recent introduction and has, in a measure, revolutionized the whole business. As there are probably now twenty-five or thirty thousand acres of peach trees in bearing, and the average yield may, probably, be one hundred baskets per acre, per year, we can well see what a boon to the growers there must be in any agent which shall prove a factor in relieving the market of surplus stock, and particularly of those grades of fruit which it does not pay to ship. Especially would this be the case with a phenomenal crop, when the yield might run up to six or eight millions of baskets. It is in these cases that the evaporator comes in, and for its introduction the fruit growers are under many obligations. The process consists in evaporating the moisture of the fruit by conveying it (the fruit) gradually through hot-air chambers, it having been prepared and placed on metal trays with wire surfaces and iron frames, or on trays with wooden frames with wire surfaces. Some of the evaporators are

upright and the trays are raised up and down by an endless chain, to give them more or less heat. There are also horizontal evaporators, and in these the trays are moved by hand, or by a crank arrangement. There are also in use evaporators working by super-heated steam, supplied from a boiler. In all these machines, experience will doubtless suggest many improvements, and I look upon this business, as well as the general fruit interests on this Peninsula, as, comparatively, in their infancy. The great value of this process lies in the fact of the remarkable retention, by the fruit, of its original flavor and of its bright color and clear condition after evaporation. I have no statistics to tell me how much fruit has been evaporated on the Peninsula during the last two years, but it has, doubtless, amounted to thousands and thousands of baskets. The market for the article is widening and gradually extending, but yet for universal use the price is too high. When we can evaporate, to pay, pared peaches at twenty cents per lb. and unpared at from ten to twelve cents, and can get a ton of peaches with a ton of coal, then we can boom the business, and all these good things are surely coming, I hope in the very near future. In fact, now, in the well regulated, large evaporators, I imagine that they often get one ton of evaporated fruit by burning one ton of coal. The smaller machines don't do so well in this respect.

All that I deem necessary, in a work of this nature,

is to give a *resumé* of the methods of evaporating, which is as follows: The fruit having been brought to the "Dry-House" is there given out to the men, women and children, who handle it. If for pared fruit it is pared either by parers or by hand. The little machines work well if the fruit is hard, but are of little use if the fruit is soft, when the operator uses a common knife. The next movement, after the peach has been pared, is to cut it in half and remove the stone; of course if you are working on unpared, this is the first operation. After this, the halves are laid close together in a single layer on the wire trays. If the fruit is firm, put the stone side down, because we want to dry the peach as flat as possible, and this is the way the trade likes the fruit. If the fruit is soft, you place the stone side up, or the peach will stick, and much of its sugar will go off with the juices. These are very important points in evaporating the peach, and I believe with the stone side up, we get more weight, provided we remove the fruit the very moment it is done. Now, here is one of the peculiarities of the consumers; they want nice-looking, white fruit, and if we dry the fruit at once, it comes out more or less of a dark-brown color, but to prevent this the fruit is exposed to the fumes of burning sulphur for from two to three minutes, in a bleacher, an air-tight box, prepared for the purpose; or in some machines, they merely throw a small quantity of sulphur into the furnace and let the

the sulphurous acid gas go through among all the trays. This bleaching of the fruit I am not prepared to say renders it unhealthy for food, but it is a great piece of foolish vanity and it should be stopped. The trays are next placed in the evaporator, and, by different processes in different evaporators, are moved up and down, or from side to side, in order to get a greater or lesser degree of heat. In from sixteen to twenty-four hours all the moisture has been driven out and we only have the solids left.

The fruit is better if put in the common peach-baskets and set about the building a day or two, free from dust and dirt of any kind. It is then packed, generally, in twenty-five and fifty-pound boxes, taking off the bottom and packing the top first ; and when full, submitting to pressure ; then nail on the bottom and on opening the top we find it with a beautiful layer of smooth fruit, which should be covered with a layer of water-proof paper, and over it a sheet of fancy stamped paper. The box is then branded with the proper brands, which, as known to the trade, are white and yellow, and pared and unpared, with any fancy brand one may choose to adopt. The better and more tastefully the fruit is gotten up, the more ready will be its sale. As to the varieties to evaporate, *Troth* is a good peach, and as it comes early, and gives the beautiful red centres, it should be encouraged by the evapo-

rating people. After *Troths* there is no very good peach to evaporate until you come to the *Stump the World.* Of course we do evaporate *Early Crawford*, *Foster*, *Old Mixon*, *Moore's*, and such varieties, but they contain too much water, and don't give the weight necessary for good profit. After *Stump*, all the other peaches are good to dry, but the best of all for profit, is *Smock. Crawford's Late* is good, but as it pays so well, generally, to ship, it is expensive to evaporate. If you want delicious flavor, with all the gustatory attributes of a perfect peach, select the Old Mixon for your evaporated fruit, and the good housewife is indeed fortunate, who can make it her *vade mecum.* There is more profit, as a rule, in drying yellow fruit, because it brings the best prices ; but this depends a good deal on the humor of the market, and I think that, at present, the white peach is rapidly gaining in favor. At the present prices of evaporated fruit, fifty cents a basket is a large price to pay for Smocks to dry, and for Old Mixons and such, thirty cents is a full price. If evaporated fruit will bring, in the wholesale market, twenty-five cents per lb., pared, and from thirteen to fifteen cents per lb., unpared, you can afford to buy orchards to evaporate, at from thirty to thirty-five cents per basket, delivered at the station, within a reasonable distance of your plant, or at your plant. *Smock* will evaporate, on an average, say, of five seasons, three and one-half pounds of pared peaches per basket. They

sometimes run up to five pounds, but for this amount, you probably have to squeeze the basket down harder than the average grower is accustomed to do. Smock unpared, ought to yield from five to five and one-half pounds. *Stump the World* will yield three pounds, pared, and four and a-half pounds, unpared. Now take all other peaches we evaporate, and no variety will probably yield, on an average, over two and three-quarter pounds, pared, and from three and a-half to four pounds, unpared. As I said before, a ton of good hard coal, should make a ton of evaporated fruit, when we are using good material in the fruit. I believe every grower who has five thousand peach trees, or even half this number, with the addition of apple and pear orchards, should have an evaporator of, at least, fifty baskets capacity, in twenty-four hours. It will save all the odds and ends, and such savings in a long life time, will be the chief factor in his thrift, that will make him rich. As to the capacity of the evaporator, everything depends on the surroundings and method of running it; some may turn out their fruit several hours short of others, but better management and better coal, will help amazingly the first one out. I believe the average evaporator, as it is usually managed and run on the peninsula, will dry, the season through, every twenty-four hours, just what its trays will hold, and this is a safe estimate to calculate on, when you are purchasing a machine.

SUN-DRIED FRUIT.

This has been driven out almost entirely by the evaporated fruit, but for sun-drying, it is pared or not, as you choose, then quartered, usually, and spread on roofs or boards, or on any convenient substance, covered with netting to keep off insects, removed under shelter in case of rain, and left in the sun until cured; the time depending much on the weather.

I have made some calculation in regard to what might be the average cost to the grower of a basket of peaches grown on the Peninsula, and delivered at the railroad station or steamboat-landing. I have considered the interest on investments in land, the trees, the loss of time before bearing, the labor, the packing, and all losses by elements, etc., with a complete loss of crop once in seven years, and I think the cost will run from twenty-five to thirty cents per basket.

Since writing the chapter in this book on the fertilization of peach orchards, I have visited the peach country, and talked and consulted with many of the most intelligent growers, have studied the question practically, myself, and as a result, have formulated the following rules for fertilizing the Peach tree. In applying these rules, study every individual tree, and apply them to it, and next, in general to the whole orchard.

RULES FOR FERTILIZING THE PEACH TREE.

RULE I. Should new shoots, at the end of the growing season, show a length of twelve inches in the longest shoots, of eight inches in the medium length shoots, and of four inches in the shortest shoots, giving a general average of eight inches for the new wood of the season, that tree will need no fertilizer to mature the next crop of fruit, if right in all other ways.

RULE II. Should the new shoots, at the end of the growing season, show a length of ten inches in the longest shoots, of five inches in the medium-length shoots, and of three inches in the short shoots, giving a general average of six inches for the new wood of the season, that tree needs potash, and with it the chlorine it gets from the kainit or muriate, especially if the leaves are not green and healthy.

RULE III. Should the new shoots, at the end of the growing season, show a length of eight inches in the longest shoots, of four inches in the medium-length shoots, and of three inches in the short shoots, giving a general average of five inches for the new wood of the season, that tree needs potash, phosphoric acid and ammonia, to mature a crop of fruit for the next season.

RULE IV. Should the new shoots, at the end of the growing season, show a length of four inches in the longest shoots, of three inches in the medium-length

shoots, and of two inches in the short shoots, giving a general average of three inches only for the growth of wood of the previous season, that tree needs potash, phosphoric acid and ammonia, extra culture and worming, the middles well cut out, and all the bearing wood cut back one-half. Also give the tree a moderate dose of iron by the methods given in the chapter on fertilization. This may save it and give a crop of good fruit.

RULE V. Examine every tree in your orchard as soon after ploughing in the spring as possible, and apply the rules as given.

PLANS OF PEACH ORCHARDS.

As I have said in the previous pages, Peach trees on the Peninsula should be set from eighteen to twenty feet apart, but if I was planting an apple-orchard, I would put the apples forty feet apart, and plant a Peach tree between each, and one in the middle of every four apple trees.

I have done this in Kent County, Maryland, and the plan has given satisfaction. The first two years I raised a crop of corn, and after that the peaches paid until the apples commenced to bear, and now, thirteen years since planting, both apples and peaches are bearing good crops, and both are doing well. As to the methods of planting peaches, such as planting them

forty to eighty feet apart each way, and then tilling the field in grain crops, I don't recommend any such method. Peach trees may be planted on head-rows, in lanes, on lawns and such places, but they don't do well, because they cannot, from the nature of their surroundings, get proper tillage.

RANDOLPH PETERS' TREE WASH.

Take lime, slack it and prepare, as for ordinary white-wash, in an old barrel. Take sufficient at a time to make a bucket two-thirds full, of proper consistence for white-wash. Add to this, one pint of gas-tar, one pound of whale-oil soap, dissolved in hot water ; or one pound of potash, or one pint of common soft-soap, or one pint of strong lye, from wood-ashes, or from concentrated lye ; then add clay or loam sufficient to make a bucketful of the wash of proper consistence to be applied with a white-wash brush. Clear away the dirt from the tree and apply with a brush, from the limbs of the tree down to the roots. It will destroy the bark-louse and all scale-insects and will give the trees a bright, clean, healthy appearance. It will drive out all borers, and moth will not deposit eggs on or about the tree the same season the wash has been applied. Rabbits and mice will not touch the trees where this wash has been used. Apply it in May for borers, and for the general benefit of the trees, and late in the autumn, as a preventive against rabbits and mice. Don't use gas-tar, pure, on trees; it will kill them.

The late Randolph Peters was always very enthusiastic in recommending this wash to me, and with an endorser of so much experience, I have no hesitation in recommending it to my readers.

Chapter IX.

In order to get the opinions of growers on many points in the peach business, I formulated the following fifteen questions, and sent copies to many of the most prominent and intelligent growers on the peninsula.

The information I obtained is interesting and valuable, and I propose to give the answers of each grower, in detail.

QUESTIONS.

(1.) Give the best list for profit of an orchard of one thousand peach trees for the Delaware and Maryland Peninsula?

(2.) What is the best soil for a peach orchard, also the best situation as to shelter, hill, valley, etc.?

(3.) What is the average life of a Peninsula peach orchard as generally cared for?

(4.) Between what points, north and south, does the peninsula peach-belt now extend?

(5.) When, in your opinion, is the peach crop most frequently and seriously injured; in the fall, winter or spring?

(6.) How low a temperature is fatal to the bud or new wood?

(7.) After the buds begin to burst into blossoms, until the peach is formed and the blossoms have dropped, at what point here is the peach most frequently destroyed by low temperature?

(8.) Do you plough your orchard as soon as frost will permit in the spring, or later? How deep do you plough, and what is your method of cultivation after one ploughing?

(9.) What fertilizers do you use, and when, and how, and in what quantity do you apply them?

(10.) When, and how, do you prune the trees; and do you ever hand-thin the fruit? If so, what result?

(11.) Do you believe there is such a disease as "Yellows?" If so, what is your opinion (briefly) of the cause, and best treatment? Do you worm your trees? If so, when and how?

(12.) Do you prefer your young trees grown from the seed of natural, or budded fruit?

(13.) Has the Curculio proved a serious enemy to the peach on the Peninsula?

(14.) Do you see any curled leaf? If so, in what soil does it occur most?

(15.) Give your ideas of the best way for our growers to market their fruit, and the best packages, etc., to use, (briefly.)

ANSWERS RECEIVED FROM GROWER, NO. 1.

Question 1. St. John, Mountain Rose, Reeves' Favorite, Moore's Favorite, President, Stump the World, Crawford's Late, Prize, Beer's Smock.

Question 2. Medium light loam soil, as near level as good drainage will allow. I prefer northern exposure.

Question 3. With fair treatment, fifteen to eighteen years.

Question 4. Kirkwood and Cape Charles.

Question 5. In the spring.

Question 6. I think ten below zero will always kill in this climate.

Question 7. Most frequently in from one to five days, but I believe they were killed this year, (1885,) in this county (New Castle) more than a fortnight after opening, by cold rains, which caused the shedding blossom to lie close around the stem end of the peach, and be wet for some time, caused the peach to rot.

Question 8. I plough as early in the spring as the ground will permit; about four inches, and work enough to keep the ground clean and mellow, until about the last of June.

Question 9. I apply about four hundred pounds of Kainit, and South Carolina Rock, mixed in equal quantities, either broadcast by hand, or with the drill.

Question 10. Prune as soon after picking the fruit as practicable, take out the dead wood, and open the centre of the trees, so as to give the fruit plenty of air and sun. I have never hand-thinned the fruit.

Question 11. I have grave doubts about there being any such disease as the Yellows. I incline to the theory, that sick trees are caused by the lack of some necessary ingredient in the soil. June and July are the months to worm in.

Question 12. From natural seed by all means.

Question 13. I am not able to state positively, but think they hurt us badly some seasons.

Question 14. I see more curled leaf some seasons than others, and incline to the opinion that the weather has more to do with it than the soil.

Question 15. The best way to market the fruit, is to sell it to the best buyer that can be found at the nearest station or landing, and I believe, that if growers all over the peninsula, would bind themselves never to ship one basket on their own account, that they would realize, at least, twenty-five per cent. more for their peaches. The five-eighth bushel basket is certainly the best package in which to ship the fruit.

ANSWERS RECEIVED FROM GROWER, NO. 2.

Question 1. If on the lower peninsula, I would plant a large portion of early fruit; for central and northern section of peach district, I would plant varieties running through the season, with large proportion of large varieties, as Reeves', Moore's, Crawford's Late, Prize, etc. If near a well established cannery, I would plant varieties that are desirable for canning.

Question 2. My experience has been, that a light soil is preferable to heavy. I have not been able to decide as to the best situation as to shelter, hill, valley, etc.

Question 3. Have seen trees twenty-five years old bearing full, and have seen some varieties on good soil, exhausted after bearing ten years.

Question 4. No answer.

Question 5. The failures in my orchard, I believe, have been caused by cold weather in spring, often when in bloom.

Question 6. No answer.

Question 7. No answer.

Question 8. I had Hale's Early trees ploughed in fall; other varieties in spring—as late as June.

Question 9. Have tried several varieties but don't know what it best. Have sought fertilizers with a good deal of Potash.

Question 10. Pruned during winter. Never hand-thinned.

Question 11. Believe there is a disease which is called the "Yellows." Have always removed the trees as soon as the disease showed on them.

Question 12. No answer.

Question 13. No answer.

Question 14. No answer.

Question 15. Sell at your shipping station if possible. The basket, and that the $\frac{5}{8}$, or standard, I have found the best package.

ANSWERS RECEIVED FROM GROWER, NO. 3.

Question 1. Troth's Early, Mountain Rose, Crawford's Early, Foster, Reeves' Favorite, Old Mixon, Moore's Favorite, Stump the World, Crawford's Late, Variegated Free, Fox's Seedling, Shipley's Late Red, Beer's Smock, Heath Cling, Salway. There are many new varieties which I have not tested.

Question 2. A nice mixture of sand and clay, not too much of either. There should be a dry sub-soil. No shelter of any kind, as it makes them blossom too soon. A dry, level, rather light soil, without hill or valley, is best, but a rolling piece of land has done well for me.

Question 3. Twelve or fifteen years ; but I have an orchard planted in 1855,(30 years ago,) the peaches from which averaged 81 cents at Wyoming this year.

Question 4. Between Clayton and Laurel principally.

Question 5. The crop is mostly injured by spring frost, but a very cold winter *alone*, wipes out the *whole* crop.

Question 6. Any temperature below zero.

Question 7. Most frequently while in blossom and before the leaves have formed. The leaves on are a protection from frost.

Question 8. I begin as soon as the ground is in order and keep the ground constantly stirred with large cultivators (3 horse) until the fruit brings down the limbs in the way of the teams. Some say the later the orchard is ploughed the better it is for the fruit. I plough very shallow. If we have heavy rains to pack the ground, I use the plough alone to stir with.

Question 9. I have used all kinds of fertilizers with out any results satisfactory to myself. Kainit and bone-meal is mostly preferred by me.

Question 10. I start my young trees branching from the ground. After that I take out the dead wood only. I have clipped off half the fruit and found the thinning was of no advantage, very much to my surprise.

Question 11. Much to my sorrow, I do. Various causes are given but the disease is not understood, and of course the treatment is altogether empirical. The best thing is to dig them up as soon as you see any evidence of the disease. I worm my trees in the fall by removing the dirt from around the tree and searching for the worm with an oyster-knife.

Question 12. From the natural seed.

Question 13. It has. I can count my own individual loss in peaches alone, at $30,000, at least, to which may be added, early apples, pears and other fruit. When the crop of peaches is small, the curculio generally takes all of it.

Question 14. I have never paid any attention to the curled leaf.

Question 15. Decidedly the best and only way to market our fruit is to bring the buyers right here to our own doors. They buy our fruit, and pay for it, from the wagon. We put it in the cars and are then done with it, and thus avoid all risk from decay, accident or falling market. These men pay us as much *here*, as our fruit sells for in the Northern cities, and they tell us that they are perfectly willing to do so, as they get it fresh, and save the trouble and expense of re-handling it. Whenever they wish it, a sworn inspector examines every

load they buy, and the fruit can be stored away in the cars at cost, for them. My best varieties bore no fruit this year, but notwithstanding this, my orchard near Dover, averaged 80 cents per basket, and my old orchard, planted 30 years ago, averaged 80¾ cents. I hauled mine to Wyoming this year, as our crop around Dover was almost a complete failure. I should think that the Murderkill orchards averaged their owners more than one dollar per basket. Two brothers applied to bank yesterday, for money to aid them in planting 200 acres. The best package is the basket.

ANSWERS RECEIVED FROM GROWER, NO. 4.

Question 1. 50 Alexander, 50 Troths, 50 Early York, 150 Reeves Favorite, 50 Moore, (or Mixon,) 150 Early Crawford, 150 Stump the World, 50 Crawford's Late, 50 Variegated Free, 50 Shipley's Late Red, 50 Beer's Smock, 50 Heath, 50 St. John, 50 Susquehanna.

Question 2. A poor gravelly soil of rolling land will mature trees sooner, give earlier fruit, color better, but dies out sooner.

Question 3. Twelve years.

Question 4. From Middletown to Woodside, from bay to bay.

Question 5. When early frost ripens the foliage, I think the bud or germs are injured ; when foliage ripens and falls after the bud is matured, there is no danger of fall injury. Peaches are seldom killed in winter or spring ; more often in fall.

Question 6. Six degrees above zero is a danger point, below that, *unless very dry*, fatal.

Question 7. At the time the young peaches shed the bloom or cap formed by the blossom, it is very tender, and a light frost may, at that period, be fatal. We have two "Sheds," the first, when the tree has formed all the buds. The second or "June shed," is when the stone is formed and hardening. Then the tree casts all it cannot mature.

Question 8. Peach orchards should be ploughed very early, as the fibrous roots are more or less injured by the plough. I would plough 8 inches deep in the middle, and shoal with a single plough up to the trees. Then keep orchard clean with an orchard cultivator.

Question 9. Leached wood-ashes, at any price, are the very best fertilizer. A barn shovel-full about the crown of each tree.

Question 10. A good time as any is to prune as you pick the fruit. Cut out everything if dead, although

not larger than a knitting needle. In small orchards, hand-pruning might do, but, generally, nature's way is best.

Question 11. Yes sir, and it is contagious. Its appearance on a small twig, even, calls for *heroic treatment* by a prompt *amputation.* Wood-ashes about the crown of the tree will restore the tree, if applied liberally, and every year.

Question 12. From natural, *healthy* seed. The early decay of present orchards is due to the germ being diseased.

Question 13. In some orchards, in some seasons, it has; but in orchards where high cultivation has given vitality to the trees, the deposit of the egg does not seem as easy of accomplishment. It is always the poor horse that dies of Botts.

Question 14. No answer.

Question 15. Sell at the nearest railroad station or steamboat landing. Use the western package; they are always clean, and more pleasing to the eye of the buyer on a hot morning, than fruit in a package on which fowls have been roosting all winter. I tried for years, during my connection with the P., W. & B. R. R., to get the company to introduce this cheap package, and abandon the return of empties, without success. If fruit growers would adopt this package, they could

demand less rates of freight, as the returns cost more than to haul the fruit to market, as you have, doubtless, seen at New Castle yard in fruit season, when James Wise and his gang were assorting fruit packages.

ANSWERS RECEIVED FROM GROWER, NO. 5.

Question 1. Alexander, Early Rivers, Mountain Rose, Crawford's Early, Reeves' Favorite, Old Mixon, Stump the World, Crawford's Late, Steven's Late Rare-Ripe, and Smock Free.

Question 2. Light, sandy soil with clay sub-soil, without protection from hill or valley.

Question 3. Twenty-five years.

Question 4. From Massey's X Roads in Kent, Co., Md., to Crisfield, Md.

Question 5. In my judgment in the spring.

Question 6. Five degrees below zero.

Question 7. In the month of May, about the time the bud opens, if a heavy frost should come.

Question 8. I plough in the month of March, as soon as the frost will permit. Let the orchard remain until the grass begins to grow, then harrow the ground with a spike-harrow. Plough not more than three inches deep.

Question 9. We use Kainit in the month of March,

before ploughing, and about five hundred pounds to the acre; spread it broadcast under the trees.

Question 10. Prune in the spring with a hand saw; have never tried thinning out fruit.

Question 11. There is certainly Yellows. I think is produced by planting the seed from budded trees. I very seldom worm a tree. Gas lime is a sovereign remedy.

Question 12. By all means from natural seed. A healthy bud from a natural seed, will produce a healthy tree.

Question 13. I do not think the curculio has ever troubled us much on the peninsula; our great trouble has been in nurserymen growing trees from budded seed, producing disease and short life.

Question 14. The curled leaf occurs, generally, on stiff, heavy land.

Question 15. I find the best way to market my fruit, is by rail, and to ship in five gallon baskets.

ANSWERS RECEIVED FROM GROWER, NO. 6.

Question 1. I should vary the list in accordance with the distance down the peninsula. For this neighborhood, or about Middletown, I would plant Mountain Rose, Crawford Early, or Mary's Choice, Old Mixon, Moore's Favorite, Reeves' Favorite, Stump the World,

Crawford's Late, (Strong,) and Smock. These would be my general orchard. I might try a few of some of the new varieties.

Question 2. A light, sandy soil, not too sandy or low, with red clay sub-soil. An open exposure we think as good as any. Peaches color at Bridgeville, Sussex county, as well, if not better, than any station I know of. The land there is a light, sandy soil, with a mixture of clay and sand, for sub-soil.

Question 3. I know of an orchard without any extra care at Bridgeville, planted in 1860, and still bears some fruit.

Question 4. Commences at Clayton station, Delaware Railroad, and runs down as far as trees are planted, probably as far south as Salisbury, is at present the Peach Belt.

Question 5. Generally in the spring.

Question 6. From 2 to 4 below zero.

Question 7. About the time, or just before, shedding the bloom ; the young peach is very tender at this stage.

Question 8. In this neigborhood we used to plough twice, early in spring, and again the last of May or first of June, say three to four inches. We ploughed from the trees the first ploughing, and to them the second,

and then worked them with the harrow. Many persons only ploughed once and then worked with cultivator.

Question 9. The best fertilizer we ever used was barn-yard manure. Ten years ago the trees seemed to grow well enough and produce without any fertilizer. Kainit is used by many with success.

Question 10. We generally trim in spring with saws. Never hand-thinned any.

Question 11. I think there is such a thing as yellows. The best treatment is to dig up the diseased trees, although there are parties here who claim that they cured such trees by the use of Kainit. We, formerly, wormed trees in fall and left a portion of the tree below the surface of ground exposed through the winter. We have long since abandoned worming.

Question 12. Most undoubtedly, natural seed all the time, and no other.

Question 13. The curculio only proves a serious enemy when peaches are scarce on the trees.

Question 14. We have often seen curled leaf but only after a frost. I do not think this is confined to any particular soil. We have often seen what we term Pin-oak leaves, but this is confined to stiff, clayey soil.

Question 15. I think, to ship in a $\frac{5}{8}$ basket is the best package to ship in, as peaches, as a rule, will bring

more in baskets than in crates. This season has convinced me that the best mode to dispose of peaches is to bring the buyers to the station and sell them by the load, according to quality, as was done at Wyoming, this season.

ANSWERS RECEIVED FROM GROWER, NO. 7.

Question 1. Troth, Mountain Rose, Foster, Crawford's Early, Reeves Favorite, Mixon, Crawford's Late, Smock, Fox's Seedling, Salway.

Question 2. Fine, sandy soil, with clay sub-soil.

Question 3. As generally treated, 10 years. Well cared for, 20 years or more.

Question 4. Lower Kent, north and western Sussex and adjoining Maryland.

Question 5. Danger any time below zero, or in spring a much lighter temperature will destroy ; even a heavy frost, when too early bloom.

Question 6. We have had good crops at 4 degrees below zero.

Question 7. Just as petal is forming.

Question 8. As soon as vegetation starts, $2\frac{1}{2}$ to 3 inches, Till as corn.

Question 9, Potash, (Kainit) 400 to 600 lbs. to acre, sometimes equal quantities of Kainit and Rock. In mid-winter or early spring.

Question 10. Early spring or early summer. In one instance two trees were trimmed or pruned in October, two in February and two in June, trees all alike. February and June did best. Two trees were hand-thinned, others by their side not hand-thinned. The hand-thinned did well, good fruit, others poor fruit and died out badly.

Question 11. No yellow about here. Worm April, May and June.

Question 12. Natural.

Question 13. No.

Question 14. Yes—stiff or clayey.

Question 15. Good fruit in baskets, ordinary in crates.

ANSWERS RECEIVED FROM GROWER, NO. 8.

Question 1. Mountain Rose, St. John, Reeves'. Foster, Old Mixon, Stump the World, Crawford's Late, Geary's Hold On, Smock with Ward's or Shipley's Late.

Question 2. Sandy loam with clay subsoil. Red clay preferable. Location should be where temperature is as near equable as possible.

Question 3. From twenty to twenty-five years.

Question 4. From Townsend to Delmar.

Question 5. If the fall has been favorable for

maturing new wood, it will stand much more cold than otherwise, and I am of the opinion that the certainty of a crop depends largely upon the condition of the tree at the beginning of winter.

Question 6. Zero and below.

Question 7. When the bud first opens and the tender peach-germ protrudes.

Question 8. I do not plough until the trees are in bloom and then cultivate with ordinary corn-cultivator till fruit is ripe ; I plough about two inches.

Question 9. I always spread broad-cast in the spring. I use potash in the most available form, i. e. kainit for bearing trees and four or five hundred pounds to the acre, and Lingo's Fish manure for young trees, three to four hundred pounds per acre.

Question 10. I prune young trees in the spring and old trees when I have finished gathering the fruit. I never hand-thin.

Question 11. I don't know anything about "yellows." I always worm and when it is most convenient. Have just finished for the season. (Oct., 1885.)

Question 12. From natural fruit.

Question 13. I don't think so.

Question 14. Very little here, but where seen generally, in a very heavy soil.

Question 15. The best way to market our fruit is to encourage the buyers to come here, and the best package is the $\frac{5}{8}$ splint basket.

ANSWERS RECEIVED FROM GROWER, NO. 9.

Question 1. 25 Early Rivers, 25 Troths, 25 Foster, 25 St. John, 50 Crawford's Early, 100 Old Mixon, 50 Moore's Favorite, 100 Stump, 25 Christiana No. 2, 25 Crawford's Late, 25 Shipley's Late Red, 25 Geary's, 25 Wilkins' Cling, 75 Magnum Bonum, 100 Brown's Choice, a new variety that comes later than Moore's Favorite, and is the finest and best shipper of the white fruit, and among the most profitable of any grown on my farms.

Question 2. A sandy loam, an open sub-soil, and should be 15 to 30 ft. to water. The best situation is an elevated piece of ground without any protection. Valleys and a northwestern protection are not suitable.

Question 3. From ten to fifteen years, all conditions right; with proper care, will live from 30 to 50 years.

Question 4. Between Smyrna and Felton, across the Peninsula.

Question 5. Spring.

Question 6. 10 degrees below zero.

Question 7. When the blossom first opens; the crop is more frequently injured by rain than frost. At this stage a northeaster will generally ruin the crop.

Question 8. No, I don't plough till first of May; 8 inches. The first week after ploughing I cross with a harrow and work once a week up until middle July with an A-iron Harrow with nine flooks in (such as we use to harrow corn.)

Question 9. A mixture of Bone, Muriate of Potash, and Kainit, about 600 lbs. to an acre either fall or spring. If land is poor and trees dont make growth enough, it would be well to apply both fall and spring. When land is good and adapted to peaches, it does not require fertilizing, as I have grown 15 crops in 16 years on such an orchard. The soil is especially adapted to peaches. Soil open and 30 feet to water.

Question 10. After planting young trees, June budded I prefer, I trim to one bud. 2nd year I trim up and cut off at 30 inches. 3d and 4th years, if trees make a vigorous growth it is best to prune but little. 5th year I shape the head, after this they want very little pruning except to take out dead wood and an occasional scattering branch, etc. If trees are overloaded, cultivate more. About 1st of July a dressing of bone at this stage would benefit.

Question 11. This is a disputed question. My opinion is that most of it comes from neglect and bad judgment in selecting land for an orchard. On good land and treated as heretofore given, an orchard will be exempt from yellows. Yes ; when it becomes necessary.

Question 12. I prefer to breed forward not backward, and cant see why Peach trees should be different from nature in any other form, animal or vegetable.

Question 13. No. Where proper cultivation and a good wash is used the Curcurlio is harmless.

Question 14. In soil that is over-limed.

Question 15. The best way to market our fruit is to mass it and sell at public auction. The $\frac{5}{8}$ basket is the the best package for peaches, in my opinion.

ANSWERS RECEIVED FROM GROWER, NO 10.

Question 1. Troths, Mountain Rose, Crawford's Early, Reeds Golden Yellow, Moore's Favorite, Stump the World, Old Mixon, Reeves Favorite, Crawford's Late Beer's Smock.

Question 2. High, flat ground, red clay gravelly soil.

Question 3. 12 years, but well cared for, 20 years.

Question 4. Duck creek or Sassafras River on north, and bay or ocean on south.

Question 5. Spring.

Question 6. Eight to ten below zero.

Question 7. When the blossom is full.

Question 8. Yes, 2 to 3 inches, work afterward with a cultivator three or four times.

Question 9. Kainit and South Carolina Rock, equal parts, 600 lbs. per acre ploughed or drilled in in the spring; this is for old trees in bearing. In raising an orchard ashes and good composted manure.

Question 10. Spring or fall. Saw or shears; never hand-thin.

Question 11. Yes, cause unknown; Kainit and Rock. Dont worm.

Question 12. Natural.

Question 13. No.

Question 14. It is more in the variety than soil; principally, Ward's Late.

Question 15. Peach Baskets. When I dont sell at home I send to a commission merchant. There are many ways of disposing of them, but good, fine fruit I should prefer to ship.

ANSWERS RECEIVED FROM GROWER, NO. 11.

Question 1. No answer.

Question 2. Light soil, slightly rolling.

Question 3. Twenty-five to thirty years.

Question 4. Middle N. C. County to Seaford.

Question 5. In the spring.

Question 6. About 10 degrees below zero.

Question 7. Immediately before full bloom.

Question 8. Just after corn planting and very deep, and follow the round of cultivation after each corn tilling.

Question 9. Rock $\frac{2}{3}$, Bone Meal $\frac{1}{3}$, 300 to 400 pounds to acre, ploughed in, in spring. Hog pen manure as a winter dressing around trees, not too close to body.

Question 10. Late in the winter, or very early in spring, so that the cut may heal speedily.

Question 11. There seems to be, don't know cause, best remedy attention and cultivation. If trees are kept clean for five or six years, worms will, perhaps, do little damage. If not, worm carefully in July or August, by hand. For young trees, take earth away in July or August, and carefully clean the body to the roots, with cloth.

Question 12. Natural.

Question 13. Not to occasion any alarm.

Question 14. Yes, mostly on springy land.

Question 15. No answer.

ANSWERS RECEIVED FROM GROWER, NO. 12.

Question 1. Mountain Rose, Foster, Reeves, Moore's Favorite, Old Mixon, Stump, Crawford Late, Variegated Free, Prize, Smock.

Question 2. Clay loam. Any soil which will grow good crop of wheat, corn and clover. High land near water is the most certain for crops, particularly if the expanse of water is great. Peninsulas often have crops when other localities fail.

Question 3. Twelve years.

Question 4. Trees are now bearing, planted as far north as Chesapeake City.

Question 5. Spring.

Question 6. No answer.

Question 7. Cannot answer intelligently.

Question 8. Plough as soon as land is in good condition in the spring, harrow and cultivate the same as a crop of corn.

Question 9. We are just beginning the use of fertilizers; expect to apply about 300 lbs. per acre, and to drill it after orchard has been ploughed and harrrowed.

Question 10. Prefer to trim as fast as fruit is picked; never have known any one to hand-thin their fruit.

Question 11. Believe trees turn yellow when declining, from any cause; generally from worms about the roots; frequently from soil not suiting the trees; when from worms, worming will sometimes do good. We used to worm every year, and it is again becoming

the custom. Remove glue and diseased bark. Generally worm in spring.

Question 12. Always *try* to get trees grown from natural seed. Many reliable nurserymen say it makes no difference.

Question 13. It has.

Question 14. Have not.

Question 15. My land being on water or branch railroads, I think it best for grower to sell fruit at so much per basket, for all he grows. If I ship, I prefer the usual size basket.

ANSWERS FROM GROWER NO. 13.

Question 1. I am not, and have not, lately, been largely enough in the peach-culture to answer the questions. I am not acquainted with the new varieties.

Question 2. The best soil, in my opinion, is a sandy loam, with yellow clay sub-soil. The best situation, is the highest, and most exposed land you have.

Question 3. From ten to fifteen years, according to soil and care.

Question 4. Not posted.

Question 5. Occasionally in the winter, mostly in the spring.

Question 6. Six to ten below zero.

Question 7. About the time the blossoms burst, and leave the young peach. I have seen them entirely destroyed at that time, and often very much injured.

Question 8. I plough as soon as the absence of frost, and the condition of the ground will permit, about four inches. Do most of the work afterward with the harrow and cultivator, unless the ground runs together very solid, then plough with a two-furrowed plough.

Question 9. None. My trees make too much wood on my land without them. I believe that is one reason why my land is very uncertain on peaches.

Question 10. I prune mostly in the spring, keep all dead wood removed, and middle of trees open. I never hand-thinned fruit.

Question 11. I do believe there is such a disease. My opinion is that it is caused, or produced, by our nurserymen, by breeding in and in, (as we say by stock,) taking seed from the orchard, and buds from the same; that is budding on budded fruit-seed. Do not worm. Worms never haunt our trees.

Question 12. Natural.

Question 13. I do not know that it has.

Question 14. I do; cannot say in what soil it occurs most, but can say this, that I have never seen any in our

locality, except when caused by frost. Leaves curl most, when fruit is hurt most.

Question 15. If you mean by the best way, the best way to handle it, I would say of a crop, ship only best, and let the rest go to the ground, if you are not fixed to handle them some other way, such as evaporating or drying. On a crop that will bring good prices all the way through, then make three kinds; extra, plain, and culls; and if you can sell your culls at home, do that; never put them on the market, if you can utilize them any other way. The best package is, I think, a nice, clean basket.

ANSWERS RECEIVED FROM GROWER, NO. 14.

Question 1. Mountain Rose, Crawford's Early, Reeves', Moore's Favorite, Stump the World, Crawford's Late, Shipley's Late Red, Wilkins' Cling.

Question 2. A sandy soil, level land, and no shelter, is preferable.

Question 3. Ten years.

Question 4. From Smyrna to Seaford.

Question 5. In the spring, after the buds begin to open with cold and frosty weather; also wet weather will cause them to drop.

Question 6. Zero.

Question 7. No answer.

Question 8. Plough to the depth of 3 or 4 inches, about the last of April, with the ground in good order, and drag-harrow each way ; then cultivate two or three times by the 20th of June, and keep all grass from trees.

Question 9. Not any the first year, after that about a quart of wood-ashes or Kainit sprinkled around each tree in the fall of the year. Manure is good, broadcast, in absence of the above, being careful to not put around the trunk of the trees for fear of mice or worms.

Question 11. What some people call yellows, is only caused by neglect or unsuitable soil. Worm the trees in the fall by clearing away the dirt, first, and, taking a sharp pointed knife, scrape all the glue off and then can be seen where the worm enters the bark, then follow the track until it is seen.

Question 12. From natural fruit, and bud then from healthy fruiting trees.

Question 13. In some localities, especially heavy improved soil, it has.

Question 14. Curled leaf is generally seen in damp, springy soil.

Question 15. No answer. Are natural trees ever affected with yellows ? As apt to be as any other.

ANSWERS RECEIVED FROM GROWER, NO. 15.

Question 1. Mountain Rose, Old Mixon, Stump

the World, Fox's Seedling, Wilkins' Cling, Crawford's Early, Crawford's Late, Smock and Beer's Smock. Do not know enough about new varieties to give an opinion.

Question 2. A level field, light, sandy land, well improved. In a low, rich place, trees go too much to wood and are apt to shed their fruit.

Question 3. Fifteen to twenty years, although I know an orchard thirty years old that was full this year.

Question 4. From Clayton to Seaford, best.

Question 5. Nine times out of ten in spring, when in bloom or after.

Question 6. All depends upon how the trees bore the previous year.

Question 7. Cannot say.

Question 8. We plough as soon as convenient in the spring. We plough shallow and then run peach cultivator through several times until August 1st, then stop.

Question 9. Kainit 500 lbs. to acre, broadcast, is *good*; but 200 lbs. Muriate Potash and 200 ground bone is *better*; and 12 loads barn-yard manure, to acre, every year, is *best*.

Question 10. Prune in spring when we can see dead wood. We never hand-thin fruit.

Question 11. I believe in yellows. When we see it, we cut tree down and burn it.

Question 12. Natural seed is best.

Question 13. Yes. If frost only leaves a few, the curculio sometimes takes them all.

Question 14. I think curled leaf with us, in the spring, often occurs from frost.

Question 15. The best way is for growers to do all in their power to induce buyers to come to their stations and sell to them, in peach baskets, being careful only to offer good fruit. Poor fruit should be given to hogs if not able to dry it. If western buyers continue to come here a year or two longer, Philadelphia and New York commission merchants will be *compelled* to come also, or do without peaches.

ANSWERS RECEIVED FROM GROWER, NO. 16.

Question 1. 100 Troth, 100 Crawford's Early, 100 Mixons, 100 Moore's, 100 Stump, 200 Crawford's Late, 200 Smock.

Question 2. A light, sandy soil, with plenty of sub-soil drainage, no red clay or loam; slightly rolling ground.

Question 3. In New Castle County, ten years.

Question 4. Middletown to Salisbury.

Question 5. Spring.

Question 6. Ten below zero.

Question 7. When it first opens.

Question 8. As soon as frost will permit, and the ground is dry enough. Plough as shallow as possible, throwing the furrow from trees first, afterwards back; after that, harrow.

Question 9. Ashes, one good pan shovel-full close around each tree, throwing it back the next year, and applying another the same way.

Question 10. Never prune, except to get close enough to cultivate; never thin out wood nor fruit.

Question 11. I know it to my sorrow; have no opinion on the subject. The best treatment would be, plenty of ashes. Worm some little in the spring.

Question 12. Know no difference. My opinion that most are grown from budded fruit. Natural fruit will have the Yellows.

Question 13. I think not.

Question 14. When the late frost touches the leaves, they are seen to curl.

Question 15. To find, first, the best market, then put them up in the most attractive way. It must be varied according to the quantity of the fruit in the

market. I think, if the growers would generally combine, and make the purchaser come to the country and buy, it would be desirable, as no more peaches would go to the market than was wanted. The balance could be disposed of at home, evaporated, etc. I don't think there is anything that carries the peach better than the basket, nor anything that shows it to a greater advantage.

ANSWERS RECEIVED FROM GROWER, NO. 17.

Question 1. Early Rivers for light soil only, Yellow St. John, Troth's Early, Mountain Rose, Foster, Crawford's Early, Reeves' Favorite or Mary's Choice, Old Mixon or Moore's Favorite, Christiana, very good. Crawford's Late, Brandywine, only for heavy soil. Stump, Fox's Seedling, Shipley's, Gearey's Hold On.

Question 2. Such soil, in different localities, which has grown fine fruit. Light soil for early kinds, and also to develop high color in all kinds, early and late. Would avoid valleys, and shelter from woods.

Question 3. With the average grower, not as long by eight years as it ought to, too many neglected while young, and too many abandoned too soon. The average ought to not be lower than 22 years.

Question 4. I think, from Dover to Delmar.

Question 5. Damage from low temperature, I

think, most frequent after March 1st. I think, lack of cultivation has much to do with trees failing to retain fruit-crops the following year.

Question 6. Have not observed closely on this point, but have seen good fruit crops after zero weather.

Question 7. I believe when in full bloom.

Question 8. I plough early, and four inches deep, and cultivate with one horse, on light ground.

Question 9. Have used kainit alone, but not with as good results as from a phosphate, with moderate percentage of potash, and large percentage of bone. If I used kainit alone, not less than 800 lbs. per acre, nor less than 500 lbs. of such brand of phosphate as used for past five years, broadcast over entire surface.

Question 10. Would head low and thin out branches thoroughly, for three years after planting, to avoid heavy cuts and to prevent branches growing in a direction to interfere with close cultivation. Cutting off branches so large that the cut will not heal over, I think takes years from the life of the tree. I believe hand-thinning pays.

Question 11. There may be a constitutional disease known as yellows, but I am not prepared to say, positively, that there is. So far as I have investigated, the cause has been from the effect of the black Aphis on

the roots; this insect does not always appear on the tree above ground. To kill worms, have used, effectively, 1 quart gas-house lime around the base of the tree.

Question 12. I know of no test on this point. Some of the best orchards I know of were grown on trees from budded seeds from canning house. Have never seen an orchard that I knew, beyond doubt, was grown from natural seed. Would make no difference between purely natural seed and those from Troth's and Smock.

Question 13. Have seen no serious damage from this cause.

Question 14. Have seen curled leaf where Aphis has been at work, without regard to soil.

Question 15. Have great hopes the Fruit Exchange will become popular. Not prepared to offer any suggestions now.

Question 16. Have seen yellows on natural trees without investigating the cause.

ANSWERS RECEIVED FROM GROWER, NO. 18.

Question 1. The Smocks and Crockets are, in my experience, perhaps, because late peaches are the first to bloom, and therefore more valuable below, on this Peninsula. (See my last pub. essay.)

Question 2. My greatest success was on the soil of "old sedge field" which failed to produce half a crop of corn (and of course wheat) and I used it as a sheep pasture, but when cultivated as a peach orchard, (as per above essay) the result in corn was amazing, (between the trees).

Question 3. At present, without above cultivation three or four years, some survive 30 years and bear.

Question 4. Middletown and Berlin.

Question 5. The late frosts of the spring impair the vitality of the sets, sometimes during three consecutive years; but our early frosts may, for seven years, destroy the crops. (See my peach essay.)

Question 6. This may depend on the wind, say 10 below zero.

Question 7. Rarely after the blossom drops.

Question 8. After the blossom. (See my essay.)

Question 9. Black Residuum. (See my essay.)

Question 10. When the fruit is well formed or half-grown, the trimming doubles its size, but my trees were trimmed severely when planted, as *customary*, and this I deprecate.

Question 11. It is not a disease any more than Ergot or Smut, but as Ergot contracts capillaries, so

also the mycelium, which produces yellows (when admitted by some defect) may contract capillaries without contact. (See my essay.)

Question 12. I should prefer seed from Carolina, (Native,) or the best specimens of budded fruit as alternative.

Question 13. It has, perhaps, both directly and indirectly, giving access to mycelium, and predisposing the tree to be vulnerable in every part. (The *split* quince tree illustrates this.)

Question 14. The curled leaf sometimes results from frost ; in its embryo it is thus destroyed.

Question 15. Uniform size and quality in each basket, separating XX from X and prime from culls. In your opinion is lime as usually used in Delaware in agriculture, useful or detrimental to the peach tree, and your reasons for your opinion ? I cannot imagine the purchase of lime as a manure, nor deprecate its presence in the culture of any plant. Lime is applied to chalk soils with apparent good effect, and I have seldom, (if ever,) analyzed a soil which contained less than 200 to 300 bushels per acre, (though never applied !) We NOW prefer to use manures which crops remove and cannot be available naturally, if relatively deficient.

ANSWERS RECEIVED FROM GROWER, NO. 19.

Question 1. We think the standard are best, such as Troth's, Early York, Alexander, (Amsden,) (if weather suits,) Crawford's Early and Late, Reeves', Beer's Smock, and Ward's Late. It is a difficult question to answer, as every one has a different opinion and ideas. I have tried a few of the new varieties, but hold to old ones.

Question 2. High loam, with red clay subsoil, a little sandy if anything, seems to produce good color as well as size.

Question 3. From ten to twenty years, according to attention and soil.

Question 4. It seems to be from Middletown to Charles City.

Question 5. It is generally in the spring, although they have been killed in winter when so extremely cold as to freeze the wood or the sap that remains up.

Question 6. When below zero, we begin to fear.

Question 7. The most fatal time is when there comes a heavy frost or a sleet, after the blossom has opened, and a frost where the peach is a fair size, will affect it so as not to be perceptible immediately, but will show when peach is further advanced in the shedding, and rotting on trees at all stages.

Question 8. It has been proven late ploughing is better, say after corn planting. When the orchard is covered with dead grass, the ground does not attract frost as much as ploughed or bare ground, therefore, the fruit is not affected by frost as readily. Shallow ploughing by all means, and cultivate well, after several times, until fruit is too large.

Question 9. Some prefer manure in spring, and others in fall, and potash in spring. Barn-yard manure by all means; if not to be had, then Potash and Bone. Spread manure broadcast, as roots are all over the ground. If Potash, drill it in. Some have an idea to put manure and fertilizers around the trunk of the tree. If in bearing, it is all nonsense; but with young trees, say 1 and 2 years old. it is different; use from 200 to 400 pounds per acre.

Question 10. As soon as the fruit is picked, I think is the best time. You can see better what is needed. We try and leave the middle open for the sun and air, and cut all branches that interfere with one another. Trim close and hard. I would not like to risk hand-thinning, as we find nature attends to that a little closer for us, as there is no certainty of them staying on. If there was I would say, thin.

Question 11. I do. It is caused principally by planting budded seed instead of natural. It is on the

same principle as breeding in stock for instance. I notice potash is a good remedy, drilled in. We always worm in the fall if possible, if they are not attended to in time, it may have something to do with the yellows. It certainly does not do a tree any good to allow the tree to bleed until a heavy gum has formed ; if it remains it will breed disease of some kind.

Question 12. Natural seed.

Question 13. I cannot say. We have not been troubled with it to our knowledge. Some years the fruit is gummy, but the cause I cannot say, and I do not think any one can give a correct idea of it. At the same time we often find a worm in a peach, (the question) how did it get there ? It must have had an egg deposited there when in blossom, or a very early stage of the peach. A full grown worm never crawled there is an absolute fact, therefore, the curculio, or some insect deposited the egg.

Question 14. Have not noticed any, if there is, it is on low, stiff, or very poor ground, not adapted to peaches.

Question 15. We found, this year, the first of the season, gallon baskets in crates sold well, but the sharpers in the city found they could buy by the basket, and put in gallon baskets and make a good profit, but it broke the market up for the grower ; we had to

ship in the regular basket the balance of the season. I think the best way is to cull your fruit close, and send nothing but good fruit ; buyers will find out your stock is good, and will always buy ahead, at an advance of the market, for they can rely on it. A great many do not cull, but work their small, imperfect ones in the middle of basket, and then complain their fruit does not pay, or the commission man is not doing what he ought to, when the grower is in fault. The great secret is to watch the market close. At times one is much better than the other. Extra fruit pays in Boston when it would not in New York. At times is better in Philadelphia. The grower must be awake to that. The man with the best fruit from a well attended orchard and posted in the market, gets the prices. Nothing like a reputation for growing No. 1 fruit. The balance will take care of itself. If you get an orchard started right, and keep it right, it will be profitable, if you get the trees you ordered. There is so much demand for trees now, the nurserymen are planting any and everything to supply the demand. Do natural trees ever have yellows ? Never heard of any.

ANSWERS RECEIVED FROM GROWER, NO. 20.

Question 1. Troth's Early Red, Mountain Rose, Reed's Golden, Reeves' Favorite, Moore's, Mixon, Stump, Shipley's Late, Beer's Smock.

Question 2. Ashy loam surface, with red or yellow clay sub-soil and high level land.

Question 3. Twelve to fifteen years in profit.

Question 4. Smyrna and Laurel.

Question 5. Spring.

Question 6. 5 to 10 degrees below zero.

Question 7. When the blossoms commence to dry up and shed.

Question 8. Prefer ploughing as early as possible ; plough very shoal, near the trees, four to five inches in the middle ; after ploughing, harrow to fine the ground ; then cultivate thoroughly and finish with harrowing, to level etc. the ground.

Question 9. Well decomposed stable or pound manure, or ground bone with Muriate of Potash or Kainit and Tankage. If the ground is rich dont think the latter is requisite. Use manure in the fall, broadcast, if trees are well grown. Use the composition in spring and plough it under.

Question 10. We prune in September and October, thin out the trees moderately but uniformly. Never thin fruit by hand.

Question 11. I believe there is such a disease which is called the yellows, but have never been able to ascer-

tain the cause or remedy. Have tried several so called remedies without satisfactory results. We worm trees in September and October.

Question 12. Prefer trees grown from seed of natural fruit.

Question 13. I don't think it has.

Question 14. Some years, from frost and curculio

Question 15. Cull carefully after picking and ship by rail in $\frac{5}{8}$ stave Peach baskets.

ANSWERS RECEIVED FROM GROWER, NO. 21

Question 1. Yellow Peaches: St. John's, Early Rivers, Reeves' Favorite, Crawford's Late, Smock, White Peaches: Mountain Rose, Troth's Early, Moore's Favorite, Fox's Seedling, Old Mixon, Ward's Late Free, Shipley's Late Red. These seem to be the favorite varieties, in this locality, Wyoming, the present peach centre. The yellow varieties bring more money per basket, but the white varieties are so much more certain and prolific bearers, I think they pay best.

Question 2. A decidedly sandy loam; the site of the orchard should be as nearly level as practicable, and should not be sheltered. On a hillside—slight declivity northward is better protected, because the fruit will be later in flowering, and therefore, less liable to late frost.

Question 3. About seventeen years. *Well* cared for, twenty-five to thirty.

Question 4. From Middletown to Delmar. The present centre seems to be Wyoming. Another decade will remove it to Harrington.

Question 5. An extraordinary drought extending into the late autumn may cause large portion of the buds to perish, but there always seem to be enough left. The most serious damage is done in the late winter or early spring by excessive cold after very bright, warm spells of weather. The warm weather starting the buds, and the extreme cold and sharp winds succeeding, causing the forward buds to perish.

Question 6. Ten degrees below zero will, usually, if continued 48 hours, kill the buds, and fifteen to twenty degrees will be very apt to kill the young wood in this climate.

Question 7. A heavy frost is almost always fatal to the peach after the bloom is made, and before the blossom has dropped, though I do not believe that low temperature, on cloudy nights, is fatal. It is the congealed moisture or frost contained and retained in the flower that causes the young peach to perish. I remember that about seven years ago, or six, Dr. Ridgely and I met one forenoon, after examining our orchards, respectively, and concurred in the opinion that the peaches were all

killed. The blossom had just done dropping and the peach was about the size of a marrowfat pea, when there came a very heavy frost succeeded by a bright, sunny morning. The small end of the peach was, at about 11 o'clock, three shades darker in color than the rest of the fruit—presenting the appearance of having been frozen and then thawed, but we had fair crops, notwithstanding.

Question 8. I have always postponed the ploughing of my orchard until the corn crop was planted, and harrowed with a drag; but I am convinced that the peach orchard ought to be ploughed as soon as the ground is settled and dry enough to plow, and harrow as often as a corn crop. A second ploughing, I believe, would be of advantage to the orchard.

Question 9. I have only used kainit, barn-yard manure, bone meal and lime, alternately. Kainit, from 400 lbs. to 800 lbs. per acre, broadcast; barn-yard manure, bone and lime, the same as for wheat and corn crops.

Question 10. I prune in February quite severely, but have never attempted hand-thinning the fruit. The curculio generally attends to that matter.

Question 11. I do believe there is such a disease as yellows, very firmly, and I believe it has been caused, sometimes, by setting an orchard with trees budded from trees all ready affected; sometimes by budding on stocks

grown from the seed of peaches, gathered from trees affected with that disease, and sometimes carried by bees and by the wind in the pollen of diseased orchards, to healthy ones. The only treatment is extermination of the diseased trees by digging up and carting off and burning. I never have wormed my trees, but propose, hereafter, to do so. But we think here that removing a portion of the dirt from around the tree in autumn and spreading hot lime in its place, and then, in the spring, replacing the dirt, prevents worms, and that an ounce of prevention is better than a pound of cure.

Question 12. I certainly prefer trees grown from the seed of the natural fruit, and would prefer buds from natural fruit if they could be had. I think every grower of peaches should raise his own trees in his own nursery.

Question 13. The curculio, in my judgment, is an aid to the grower when the orchard is too heavily set in fruit, but when the crop of young peaches is light, the curculio will have its share and to that extent is a serious enemy to the peach in this region. The best thing to be done when the crop is likely to be too much decimated, is to work the orchard frequently, and in doing so to jar the tree by striking the padded swingle-tree of the plough or harrow against every tree. This keeps the insect always on the go.

Question 14. I have often seen the curled leaf. It

ls found most abundantly on cold, stiff soils and after cold, easterly storms. I have rarely seen it on warm, sandy loam soils, even after such storms, unless when long continued and very severe.

Question 15. I think the best way to market the peach is to pack them, Extra fine fruit, in small baskets, say one peck baskets. The strictly prime, in the $\frac{5}{8}$ basket; and when the crop is not abundant, crate the residue, except the culls, and sell them to the dryers, or dry them yourself. When the crop is very large I prefer to sell all to the dryers except the extras and strictly prime. We sell here, at Wyoming, almost every grade for the last three years to the buyers, who come here from the north, east and west, to sojourn with us for the peach season, and peaches bring here 20 per cent. more than at any other station on the road except Bridgeville, and some 10 per cent. more than at Bridgeville.

May I suggest what I deem an improvement over the mode of setting out peach orchards usually followed? Almost every person plants peach trees 20 feet apart each way. The finest fruit in flavor, size and color that I have ever known raised on any orchard in this section of the country, grew on one which I planted twenty-seven years ago, and pulled up seven years ago. Instead of planting the trees 20 feet apart east and west, I set them 24 feet apart. By so doing the trees never inter-

laced their branches, and the south and southwest winds which prevailed here in summer had full scope at every peach on every tree, and the sun could also shine on every peach not entirely shaded by the leaves. The result was that I had the best fruit raised in this section, the highest color, largest size and finest flavored, and it sold higher than any other to the New York buyers. In 1865, Messrs. Wanson & Feree of that city, paid me $1.05 per basket for all my fruit, which was 10 cents higher than they paid any other person. I sold them 3,960 baskets and they told me at the close of the season that they had made $1200 on my crop. The fruit averaged them $1.60 per basket in the N. Y. market. After the bargain for the orchard had been made I felt that the price might be an unreasonable one and told Mr. Feree, who was here, to keep an accurate account of all shipments of my fruit, I would divide the loss with them. He said he had done so with the above result.

One further suggestion I must inflict upon you. Hon. Jacob Blair, ex-M. C. from West Virginia, told me some years ago, that a friend of his over in Ohio had not failed to raise a good crop of peaches in thirty years, and that his fruit commanded an extra price in the Pittsburg and other markets. I wrote to that gentleman, and he attributed his unvaried success to raising a mound a foot high around each tree at one year old, increasing it each year, till it became three feet high.

Result no worm, no yellows, no disease, long lived tree, and a sure crop every year of the very finest fruit. The mound freezing solid, kept the blooming back, he said, a week or more, until the late frosts were past. I propose to try this on a few trees of each variety this season.

A LETTER FROM GROWER, NO. 22.

I have not your circular at hand. I think the yellows are the result of neglect and starvation, and sometimes largely attributed to the borer. I know that yellows can be cured by applying to the soil the essential normal elements of the constituents of the peach—bark, pith, leaf and general fibre—which are readily determined by careful analysis. Starvation is the principal and chief cause of yellows. In my opinion, I consider it as essential to restore, annually, to the soil, the ingredients of the peach, as it is to do so for wheat or corn. I think kainit very beneficial, as well as many other things. I think if you propose writing an article on the peach, you should urge the imperative necessity of organization—systematic organization for the intelligent distribution of our fruit. The millions of trees now being planted will certainly create a great glut and consequent distress, unless a central office shall daily receive telegraphic reports from every station, of the quantity and destination of each car, and on finding more cars are consigned to any one city than said city can readily

consume, at paying prices, the President of the Association, shall have authority to distribute the said cars, judiciously, among the many hundred towns to which the Pennsylvania Rail Road will deliver them. Thus, gluts can be avoided, and an intelligent supervision be established and consequent remunerative rates be maintained. The Association should select, in every town, the most reliable firm, early in the season, and, if possible, obtain security in some shape, or a guarantee of their payments and general fair dealing. Some such organization will soon become imperative.

SHIPPING PEACHES TO EUROPE.

That peaches may be shipped to Europe, and the experiment prove profitable, Mr. G. A. Cochran, of Middletown, has shown. He shipped tomatoes successfully last year, but did not try peaches until this season. He packed them in the individual ripe-fruit case, each peach packed by itself, thoroughly ventilated during the transit, and shipped them by the fast steamers of the Cunard line, as the *Oregon*, the *Umbria*, and the *Etruria*, either steamer making an average passage to Liverpool of under eight days. Mr. Cochran picked peaches at Clayton, August 20th, shipped them by ordinary freight to New York, and put them on the steamer of August 22d. They were landed in Liverpool on the night of August 30th, and were sold the next day, eleven days after picking at Clayton. They were in fine order,

selling readily at $9 per case, and cost him for fruit, freights and commissions, about $4.80 per case. There were 288 peaches in each case, each packed by itself. It will be seen the peaches cost him $1\frac{2}{3}$ cents each, and he sold them at wholesale for $3\frac{1}{8}$ cents each.

THE PEAR.

Chapter X.

The Pear.

INTRODUCTION.

Where ever the two fruits have been grown, the pear has probably, heretofore, been looked upon as a luxury, on account of its very delicate flavor and lusciousness, and its scarcity, and the apple as a necessity, from its unrivalled excellence as an article of fruit-diet, and its abundance. The great increase in the cultivation of the pear is bringing it before the masses of the people much more prominently than formerly as an article of food, and it is now becoming every year a most formidable rival of the apple ; although I dont think it can by any means reach the popularity of that fruit as a general fruit for household use. The pear belongs to the rose family and resembles the apple. In its wild state it is one of the most repulsive mouthfuls that can be conceived of, as any one can verify by eating one of our common choke-pears, and even this is luscious in comparison with the wild pear. So when we afterward revel in all the concen-

trated sweets of a well ripened Beurré d' Anjou we can readily see what cultivation has done for the fruit we are discussing. Pears are frequently mentioned in the writings of the Ancient Greeks, Romans, Syrians and Egyptians,and came from the east through Italy,and were from here scattered over Western Europe,and from thence to the Western Hemisphere. The Pears used by these early people were, from all accounts, not of the exquisite flavor of our modern varieties, and the flavor did not improve greatly until the latter part of the sixteenth century, and it is only during the last one hundred and twenty-five years that we have added such luxuries as the Bartlett, the Seckel and the Beurré d' Anjou. The finding of the Seckel in this country as an accidental variety shows that we have all the requisites here for the pear to thrive and develope its most exquisite qualities The Pear Tree, as a standard, lives to a great age, reaches often, a very large size ; commences to bear at a comparatively early age and yields a great abundance of fruit. There is a fermented drink made from pears called Perry to distinguish it from the Cider made from apples, but in the local option counties of the Eastern Shore it is called "Pear Cider" and in many cases proves itself a very entangling alliance.

The Pear tree starting from the seed is developed as follows : We plant the seed, heat, moisture, and air, cause *germination*, and, if we bury it too deep, so as to

exclude it from air, it wont germinate, and, like many other seeds planted too deep, the crop fails to come. The seed germinating, cell-growth commences with this germination, and by this proliferation of cells the tree in all its parts is formed. A limb several inches in diameter cut across will reveal millions of cells, so numerous are they, and each cell in itself is a perfect organization, and thus it is easy to see, if the cells become diseased or are preyed upon by any parasite or other enemy, how at once the whole tree must suffer. The importance of this cell-explanation will be seen when we come to talk of the diseases and enemies of the pear. The roots we all know by sight ; there is the main root called the tap-root, and it runs downwards into the ground ; scan this root well, as it measures the depth of the hole we will dig when we come to plant the tree. This tap-root throws off laterals and the laterals throw off fibres called fibrous roots or rootlets, and, in turn, these throw off hair-like roots or root-hairs, and thus the root is made up. The roots absorb moisture from the soil, and the more minute roots are always the most active in this work. Now where the root joins the body of the tree we call the collar, and we can change the situation of the collar by banking up the earth around the tree ; then that part of the body covered by earth will throw out rootlets and the collar will move upwards. Now we have the body of the tree ; then come the bark, the

branches, and the leaves. The bark is for the conveyance of the sap, or blood of the tree, up in the spring and down in the fall. The sap descends from the leaves through the inner bark and deposits its layers of wood and bark annually. The body-wood is composed of the sap-wood and the old wood ; and the branches are the main or leading branches ; then descending in size to the shoots or growing part of the limbs ; and last, the fruit-spurs. Now again there are the buds of the leaves and the buds of the blossoms or fruit-buds. The leaf-buds grow into branches of the tree. On the pear the leaf-buds grow on the new wood of the year, and the fruit-buds come on the wood of the last year, and grow on the end of spurs called fruit-spurs, growing out from this last year's wood. Now, all this is important as will be seen when we come to speak of fertilizing Pear trees. In young trees growing rapidly, all buds are leaf-buds ; as they grow old, growth is slower, and many leaf-buds become fruit-buds ; and hence, the tree becomes fruitful, and so, by encouraging growth in Pear trees, in fact, in most fruit trees, we discourage fruiting, and by checking growth of wood we encourage fruiting ; but if this be done too much, the tree and its product both will suffer in the end. Now this does not hold true as to vigorous growing Pear trees coming into bearing late, for some of the most vigorous growers, as the Bartlett, Le Conte and Kieffer, come into bearing very early, and some

of the slow growers, as Beurré Bosc, come in late. The leaves are made up of the veins, the ribs, and the leaf-stalk ; thus giving the frame work and vessels for the flowing of the sap, and the leaf is completed. Then we have the green pulp which fills the intervals of the frame work, and the whole covered by skin. These leaves are made up of cells crowded together on the upper side of the leaf, and on the lower side not so closely crowded. Hence the leaf is of a darker green on the upper side than on the lower side. On the lower side are mostly situated the pores for breathing, and in the pear, number thirty thousand to the square inch. The pear is exogenous ; that is, grows by additions to the outside of the wood ; and the process of growing of such trees is as follows, as described by physiological botanists, and for the main parts of which description, as for the foregoing, I am indebted to the admirable work of Thomas, on Fruit Culture. The roots absorb water, which, in them, changes slightly by matter from the root cells being added, and is then sap. The sap passes from cell to cell, up through the sap-wood until it reaches the leaves. Now the sap having reached the leaf emerges from the dark cells through which it has been traveling and is spread out to sun-light. Now it is largely evaporated through the breathing pores of the leaf we just now spoke of, and it is thickened. The carbonic acid of the air, and that previously contained

in the sap, unites with the oxygen and hydrogen of the sap, and produces wood fibre, which is a triple compound of oxygen, hydrogen, and carbon, the oxygen of the carbonic acid escaping. Here the tree in breathing then gives out oxygen, while an animal in breathing, or any fire burning, gives out carbonic acid, and thus has God established the equilibrium in nature—and thus it is that what is poison to man is food to plants.

Now leaves require sunlight to decompose carbonic acid, and it does not go on in the dark, and, hence, flowers in bed-rooms, at night, are not feeding on the carbon exhaled by sleepers—and doing the good many suppose them to do—but in day time they are in the sunlight actively decomposing carbonic acid gas and giving out oxygen, and, hence, may be tolerated as healthful, so far as this process is concerned, but I discourage, altogether, the keeping of growing plants in any part of dwelling houses, as the earth about them and the decaying parts of the plant being necessarily attended by fermentation, disease-germs may be developed with serious consequences. The sap having now been thickened by evaporation in the leaf, comes down through the inner bark and forms a layer of semi-liquid matter between the bark and the wood ; this is called cambium and is now divided up, the great part goes to make a new layer of wood, and a small part goes to make a new layer of bark. In budding and grafting this cambium is

one of the chief essentials in a take. This rapid evaporation through the leaves, gives us some valuable hints in transplanting pear or any other trees—always strip a tree of leaves before transplanting it—if you don't, the evaporation will be so rapid through the leaves that the tree will wither and die, but strip off the leaves and then transplant, and the tree sap wiil stay there and supply the tree until it has become accustomed to its new condition. So in moving a tree whilst in the growing season, and some of the roots are sacrificed in getting it up, you must also cut off some of the top, as too many leaves would cause too rapid evaporation for those roots that remain.

The uses of the leaves of the tree being so necessary, it may well be seen what an injury the slug may prove to the Pear tree, especially when it often destroys a greater portion of its leaves.

The bark performs a duty for the tree somewhat similar to that of the leaf, and with its adjoining cells preserves the identity of the class, as pear, apple, peach, etc.

Here is a beautiful evidence of nature in preserving her identity,—bud the pear on the quince—all the leaves will grow on the pear top—yet all the nourishment these leaves make and send down the tree will make quince wood and bark on the quince, and pear wood and bark on the pear.

THE PEAR BUDS

are large and at the proper time expand into the flowers or blossoms,—and these blossoms are very beautiful, being pure white with purple anthers. These blossoms form into the fruit and the fruit contains the seeds and the seeds continue the propagation of the species.

The flower is composed of the outside calyx—and the corolla or blossom leaves within the calyx. Now the necessary parts of the blossoms are the stamens and pistils. In the pear the anthers or head of the stamens are purple. In these anthers are the pollen, and it is discharged by the bursting of the anther, and this pollen is the fertilizing material essential to the reproduction of the species. The thread-like stalk of a stamen is called a filiment. The pistil consists of a stigma at the top, then below it the style to support the stigma and the ovary or future seed-vessel of the fruit. Now the pollen from the stamens falls on the stigma and the ovules are fertilized and become the seeds of the fruit, and the fruit itself, as we understand it, is merely for the growth and protection of the seed, the true embryo tree. All this talk will be of avail when we come to speak of hybrid pears, as the Kieffer.

Now just here let me speak of one thing in fruit-growing we hear often of, and ignorance, of which has and will, cost much loss, viz.; the so called pistillate or

imperfect blossom and the bisexual or perfect blossom. Take the Crescent strawberry for example, one of our most productive sorts; it has a pistillate or imperfect blossom, and hence can't fertilize itself, and so to ensure a crop of Crescents we must plant to every two rows of them, one row of a variety, (as the Sharpless,) having a bisexual or perfect blossom. The pollen from the anther of the Sharpless fertilizes the ovule in the ovary of the Crescent and thus the perfect Crescent berry is produced. Take a blossom of the Crescent and one of the Sharpless, and note the difference; the pistils are there generally on the Crescent blossom, and on the Sharpless blossom you see the stamens and the anthers on the top of them, making them, with the pistils and other parts, the perfect or bisexual blossoms.

The varieties of the Pear number into the thousands, and, probably, over one thousand have been fruited in the United States. We divide Pear trees into the standard or single trees—the dwarf or compound trees, and hybrid trees—and the fruit is spoken of, or rather should be spoken of, as fruit from standards—fruit from dwarfs, and fruit from hybrids. The standard is the original Pear tree. The dwarf is one where the pear-stalk has been grafted or budded on the quince root, and thus the tree is, in a measure, dwarfed. It may also be grafted or budded on the thorn and some other roots with the same result. The hybrid tree is one where the

blossom of one tree has been fertilized by the blossom of another tree, and the blossom of the producing tree, maturing a pear which shall contain a seed, and which seed, planted, shall produce a pear like neither of the trees which took part in its creation. In fact, the product will be a hybrid, a mule among pears.

The Kieffer is a good example of a hybrid pear, and is supposed to be a cross between the Chinese Sand Pear, and a Bartlett grown near it in the garden of Peter Kieffer, of Philadelphia, where the original Kieffer tree is still standing, and is now eighteen years old. The best specimen of a Chinese Sand Pear tree that I know of, is in the grounds of Thomas Holcomb, Esquire, the efficient Recorder of Deeds of New Castle County, Delaware, and can be seen in the lawn surrounding his residence in the city of New Castle. The pear is among the oldest of our fruit trees on the Peninsula, and specimen trees are now standing, over a century old, and trees were, undoubtedly, planted soon after their arrival, by the French Huguenots, who came over and settled here after the revocation of the Edict of Nantes in 1685. Now, as to how long pear growing for profit in field culture has been conducted on the Peninsula, two decades, or at most three decades, of the past, will, I have no doubt, cover the time, and how successful it has been or with what discouragements it has been attended, will be shown, in part, by the answers to the

questions which I sent to most of the intelligent pear-growers of the Peninsula, and which will be found in their appropriate place in this book. As to my own opinion, gained from personal experience, and from observation and intercourse with pear-growers, it is, that pear growing *is* profitable, and a grand industry for the Peninsula farmer—if—(and that *if* must be spelled with a great big

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he be alive to every detail and to every surrounding of the business. In this it differs from no other kind of farming, or from no other kind of business, for I think the great source of the want of success of men in all manner of business, is this lack of attention to detail ; for detail comprises everything necessary to make the successful business man ; labor, energy, thrift, experience, quick perception, and to these traits might be added, the obeying of the laws of God and man.

There is no royal road to success in pear-culture. It is a fruit, of all other fruits, that demands a grower's every attention and his most guarded care and watching. It is so subject to disease and injury from pests of the insect order, that for some parts of the year it requires attention even in the dark hours of the night, and the man who is not alive to all this need have no high hope of succeeding in its successful cultivation. I have seen some statistics which prove that of all the Pear Trees

planted in one of the New England States, at the end of ten years from such planting, not over ten per cent. of the trees were healthy and alive. The mortality on the Peninsula has not been so great as that, perhaps, but it certainly reaches nearer that loss than most persons at first thought would imagine.

When one wishes to plant pears he should watch every detail, as near as possible, from the seed to the tree in the orchard, for the most vital mistakes are made in getting poor trees, and in getting the wrong varieties, and then in selecting the wrong soil and exposure, and in the wrong culture and fertilizing, or lack of proper culture and fertilizing.

Be watchful, be vigilant, be industrious, and adopt the experience gained from experienced growers, constantly endeavoring to improve on the best methods, and with every attention to detail, as any other good business man is attentive to the carrying on of his business, you will make pear-growing, at once, successful, profitable and delightfully entertaining.

Chapter XI.

PROPAGATION OF THE PEAR.

In propagating the Pear it is necessary to have very rich land, especially here where our summers are hot, and if not very rich, the site for the seedling bed should be made so by wood ashes, and artificial fertilizers, containing all the elements of plant-food, as potash, phosphoric acid, ammonia, etc. I would not use raw manure, but only manure, if at all, that had been composted for a long time. These green manures breed bacteria, and I am satisfied would start unhealthy trees. Now the most important thing coming next, is the seed, to have them pure, in order to start healthy trees. Here, I believe, is the great, first cause of diseased pear trees now so common, the use of seed from all sorts of pears, natural, dieased, budded, grafted, and any other kind that may turn up, either here, in America, or in Europe. Indeed the very same causes that produce diseased Peach trees are producing diseased Pear trees. I think most of our pear seedlings now used in this country are imported from France, and are from one to three years old when received.

The seed should be from healthy common Choke, or Hedge pears if possible, and certainly the least relation the seeds bear to our finer pears the better. They should be planted in the fall, very soon after they have been taken from the fruit. Plant them in broad drills and keep them well tilled and attended to, until they are about one-fourth of an inch in diameter, and then take them up in the spring or fall and transplant them to nursery rows, twelve inches apart, and four feet between the rows. These may be budded or grafted in a year. The great enemy to pear seedlings is leaf-blight. It comes on in mid-summer, the leaves turn brown and drop off. The cause is, probably, the aphis and other insects, and raw manures. The remedy is to pull out diseased trees, avoid raw manures, and not to force the tree too much, and cultivate attentively, and Paris Green or Hellebore the leaves in the season. The seedlings which come from France and other parts of Europe, reach here in the fall; are then kept in moist sand or saw-dust in a cellar, or room protected from frost, are then planted the following spring in nursery row, and budded in the following July and August. If the seedlings are large and it is intended to graft them, they may be kept as before stated, and grafted in the winter at your leisure, and returned to the damp sand or saw-dust, and then set out the coming spring in nursery-row, planting the graft in the ground and

covering all up to the first fruit-bud of the new pear-stock to which the root of the seedling had been grafted. The pear may be budded on the thorn, the mountain ash, or the apple, but the practice is not to be recommended. Dwarf trees are propagated by budding the pear stock to the root of the Angers Quince; thus to some extent dwarfing the pear. The pear is deficient in fibrous roots and should never be transplanted of large size; and one year old trees are much more likely to live than larger, finer looking trees. Pears are, I think, more surely propagated by budding than by grafting for nursery stock, and the method of budding is the same as that employed for the peach, for the description of which the reader is referred to the article on budding the peach. The pears are budded in July, August and September, hereabouts; in from ten to fifteen days the strings are cut off, and the following spring the tops are cut off down to the bud. The new bud is encouraged and developed during the following summer; all buds kept rubbed off on the stock below it, and the next fall or spring is ready to set out in the orchard. If it be wished to graft the pear to the seedling instead of budding them, it is usually done when the nurseryman has time through the winter. Taking them out of the sand or saw-dust and returning them when finished, and planting them out in the spring. The larger seedlings are, perhaps, better grafted than

budded. Tongue grafting is, I believe, most often employed, although some use saddle grafting, and not often cleft grafting.

A saddle graft is where, for instance, we commence back an inch more or less from the bottom of the seedling cut square off several inches above the root; now shave off each side so as to make a sharp wedge. Now take the corresponding end of the pear stock you wish to graft on to the seedling, in it cut a deep notch to receive the wedge of the seedling. One fits accurately into the other when cut by an expert.

Tongue grafting is where you shave off only one side of each instead of making a complete wedge, then cut notches in the two cut sides and apply them together so the notches dove-tail in. Cleft grafting is where you split the large limb and set in one or more of the grafts wedged a little at the inserting end. After the stalks have been grafted, tie them with waxed cotton yarn and put them back in the cellar. In the spring set them out and put the graft several inches under ground, at least up to the first or best bud on the new stalk. Don't trouble about the yarn, it rots off itself.

For a full description of grafting and budding, see Charles Downing's Fruits and Fruit Trees of America. Here you will find plates, and without plates it is not easy to properly demonstrate such matters in a book.

Practically, grafting and budding are very easily learned and all fruit growers should become experts.

Now we have the trees ready for the orchard, and before going into the orchard I propose to treat of the varieties of the pear grown on the Peninsula.

Chapter XII.

VARIETIES OF THE PEAR GROWN ON THE PENINSULA.

Probably, any pear that will thrive in other parts of the world will grow on the Delaware and Chesapeake Peninsula. I dont intend by any means to convey the idea though, that all these varieties of pears are desirable for Peninsula culture, for as we advance in the subject the reader will see that the number of desirable and profitable varieties are indeed few, and one of the greatest errors in the business, next to getting the wrong kinds is, to get too many kinds.

Before going into the varieties of the fruit, let us speak briefly of the various classes of the trees. These are, the Standards, the Dwarfs, and the Hybrids, which are standards. It has been seen how we propagate the Standard, and *it* is the true pear tree; strong and vigorous, with no taint of other blood, it should and does grow and bear fruit for hundreds of years.

The next, the Dwarf tree is, as has been shown, a compound tree, a pear tree with a quince root. The quince is only for the root to give life to the pear trunk,

but if we plant the tree deep, several inches up the pear stalk, the pear stock will throw off roots and then we will have what is called a half Standard tree.

The Hybrid trees are obtained, as before stated, by the pollen of one tree standing near another, fertilizing the blossom of the mother tree, and the seed of that fruit being planted, brings forth a new tree with fruit different from both parent trees. Fruit propagators often carry on this fertilizing of blossoms, artificially.

Now what kind of pear tree shall we plant on the Peninsula; Standards or Dwarfs?

P. T. Quinn of Newark, New Jersey, a great authority on pears in his neighborhood, writing in 1869, declared all Dwarf pears for orchard culture a failure except the Duchess, and this only does well on quince roots, but becomes half standard by throwing out roots from the pear stock. By judicious pruning, he says, he brings his Standards into bearing at from four to five years old. Now this is better than we can do on the Peninsula with our Standard trees, and fully as well as we can do with Dwarfs.

I have looked into this matter very closely as to the advisability of planting Standards or Dwarfs. I have visited many of the celebrated pear orchards of the Peninsula, and have talked with, and argued the question with many of the most successful growers, and am very

decidedly of the opinion that were I limited to one kind I would unreservedly choose the Dwarf pear to plant for profit in field culture on the Delaware and Chesapeake Peninsula.

I have only been doubtful as to one variety, the Lawrence ; is it not better as a Standard ? A recent visit to the orchards of John H. Hessey in Cecil county, Maryland, has convinced me that even the Lawrence is all right as a Dwarf, and bears about as regularly, (being full every other year and shy the intervening year,) as it does as a Standard, and the Standard fruit cannot be finer than Mr. Hessey's dwarf fruit. I had four hundred and fifty baskets of Lawrence this year from a little over one hundred Standard trees, which I thought very fine, but Mr. Hessey's, from Dwarf trees, were equally good.

Pear trees were dwarfed in France, probably, one hundred years ago, and in this country have only been planted for about seventy years, and are, I think, constantly growing in favor. They demand and admit of high culture, which gives the largest and best specimens of fruit, and this is not always so with Standards. Notwithstanding what may be said to the contrary, they *do* come in bearing for profit, in just about one half the time that Standards come, barring one or two varieties of Standards. They cost less at first, they take up less ground, they are more sure to stand after transplanting

from the nursery, and when properly planted they become half Standards, and will live much longer than the average life usually given them, which is from fifteen to twenty-five years. Having planted the proper varieties, they suffer less from the ravages of the blight and other diseases than Standards.

I have now growing on my fruit farms over six thousand pear trees, and only about one thousand of them are Standards, and I would be thoroughly satisfied if the ground they occupied was in Dwarfs, although most of the Standards are past twelve years planted. As to the hybrid trees, they grow very rapidly as Standards and come in bearing very early, and they have not been thoroughly tested on the quince, and as yet, therefore, I should recommend those planting them to plant Standards, at the same time testing them thoroughly on quince. I refer to the new hybrids from the Japanese Sand Pears.

THE SHAPES OF PEARS.

The Massachusetts Horticultural Society's classification is now generally adopted, and is good, as follows:

Globular. Ovate. Oblate. Oblong. Globular obtuse pyriform. Globular acute pyriform. Ovate pyriform. Obovate acute pyriform. Obovate obtuse pyriform. Oblong pyriform. Oblong ovate pyriform. Oblong obovate pyriform.

As to the quality, we say, after the American Pomological Society, "best," "very good" and "good."

As to size, we say, "large," "medium" and small."

For example take the Lawrence pear, it is,

As to shape, obovate obtuse pyriform.

As to quality, best.

As to size, medium.

As to some of the prefixes formerly used to names of pears, I shall, as far as possible, dispense with them in this work, as Doyenné, Beurré, etc., as they convey no particular distinctive mark to the pear.

LIST OF PEARS THAT MAY BE GROWN ON THE DELAWARE AND CHESAPEAKE PENINSULA.

The list is given, as near as possible, in the order of ripening. It would be impossible to make such a list absolutely correct in this respect, as many varieties vary with soil, season, etc. S—Standard. D—Dwarf. S and D—Standard or Dwarf, that is, will succeed well on either.

1 Lawson, or Comet,.....S and D
2 Summer Doyenné,.....S
3 Sugar Pear,.....S
4 Madeline,.....S
5 Mannings Elizabeth,.....S and D
6 Ott,.....S

7 Dearborn's Seedling, ... S
8 Bloodgood, ... S
9 Julienne, ... S
10 Brandywine, ... S
11 Bell, ... S
12 Bartlett, ... S and D
13 Rostiezer, ... S
14 Tyson, ... S
15 Howell, ... S and D
16 Lodge, ... S
17 Le Conte, ... S
18 Bergamotte, ... S
19 Wilmington, ... S
20 Belle Lucrative, ... S
21 Duchess, ... D
22 Buffum, ... S and D
23 Louis Bonne (de Jersey), ... D
24 Boussock, ... S
25 d' Anjou, ... D
26 Bosc, ... S
27 Urbaniste, ... S
28 Dix, ... S
29 Sheldon, ... S and D
30 Rütter, ... S
31 Butter, ... S
32 Clairgeau, ... S
33 Seckel, ... S

34 Kieffer, ...S and D
35 Garbers Hybrid, ...S
36 Lawrence, ... S and D
37 Vicar of Winkfield, ...S and D
38 Winter Nelis, ...S
39 Easter, ... D
40 Sha Lea, (Chinese Sand Pear,)..... S
41 Suet Lea, (Chinese Snow Pear,).....S
42 Daimyo, Japanese, ...S
43 Mikado, Japanese, ... S
44 Cin Cin Cis, Japanese, ... S
45 Hawaii, (Sandwich Island Pear,).....S

I add these oriental pears as they may become useful and very valuable for hybridizing with our native pears.

Clapp's Favorite is also grown on the Peninsula, chiefly as standard. Don't plant it. It is a beautiful tree with beautiful fruit for a few years, but almost invariably dies of blight.

Lawson or Comet.—Propagated and put on the market by Wm. Parry, Pomona Nurseries, N. J., a very intelligent and reliable man. He says it is the earliest pear ripening in July, is a vigorous upright grower with healthy foliage. The tree has been in existence 100 years and has never been known to blight. Very productive and bears young, and is reliable either as

standard or dwarf. It came from the Lawson Farm in New York State. As to quality it has been pronounced only third rate by those experienced in testing the eating qualities of pears, and resembles the old French Jargonelle. The fruit is large and handsome, with a red blush. I advise Peninsula growers to test it carefully and moderately. We don't expect to get the luscious perfumed pears so early in the season, yet my great doubt in regard to this pear is whether or not it is fit to eat.

Summer Doyenné.—I believe this is our most profitable summer pear for the Peninsula. It bears young and full, regular crops, and the fruit is small, but is well colored, juicy, sweet and well flavored. I have it, it ships well and it pays me well, it bligths moderately.—*Standard.*

Sugar Pear.—I introduce this pear on the authority of Thomas J. Shallcross, a well-known fruit grower of Kent county, Maryland.

It is the same as the Harvest Pear and ripens in July. Tree grows and bears well. Fruit small, round, pale yellow, brownish red tinge in the light, with some brown and green dots. Flesh sweet, but rather mealy.—*Standard.*

Madeline.—Recommended to me by Henry H. McMullen, a well known and very intelligent fruit grower of New Castle Hundred, New Castle County, Delaware.

It is good as an early retail market pear, but it won't ship long distances. The tree is vigorous and the fruit is pleasant and refreshing, and of medium size, of pale yellowish green color. This pear has some perfume, a valuable quality, particularly in an early pear. It is rather too much given to the blight. *Standard.*

Manning's Elizabeth.—An elegant, early pear, standard or dwarf, but my objection to it is that it inclines to blight, as we generally get the trees from nurserymen, at present. Fruit is medium size, yellow, and red cheek, with dots. Is juicy and melting, and and will ship well for an early pear. After the tree gets to be twelve years old the fruit deteriorates and the tree needs to be treated as recommended for Duchess.

Ott.—Albert H. Silver, Esq., of Red Lion, Del. grows this pear to perfection. It is a seedling of the Seckel. Tree productive and grows moderately. Fruit small, greenish yellow and reddish. Is rich in flavor, aromatic and perfumed, different specimens vary in flavor. Comes early.—Standard.

Dearborns Seedling.—Fruit medium size ; light yellow ; flesh white and juicy, melting ; Standard.

Bloodgood.—Richard Jackson recommends this pear, and he is good authority. Other growers dont think it desirable. The fruit I think has the highest flavor of

any of our early pears, but to have it in perfection it should be ripened in the house like most of our summer pears. Yellow and russetty in color. In flavor it is rich, melting and aromatic, and is perfumed ; Standard.

Julienne.—Richard Jackson of Hare's Corner, Delaware, also recommends this pear for a retail market near home. The tree comes in early and is productive. It is of good flavor when prime, but varies in this respect with different seasons, and that is an objection. Fruit small, yellow ; flesh white ; moderately juicy and sweet. *Standard.*

Brandywine.—Found on Eli Harvey's farm on the Brandywine. Fruit dull green and russetty, and reddish on one side ; flesh sweet and aromatic. *Standard.*

Bell.—Recommended to me by Thomas J. Shallcross of Kent county, Maryland. Fruit large, greenish ; early fall or last of summer. Standard.

Bartlett.—Undoubtedly the most profitable variety for Peninsula field culture. It is the pear to eat, the pear to dry, the pear to can and the pear to plant. Originated in England in 1770, and was brought to Massachusetts and cultivated by Enoch Bartlett ; hence, its name here. A Mr. Williams was its English propagator. It suits the Peninsula climate admirably, and as it will ripen into a delicious pear if pulled only two-

thirds grown, we can throw it into the northern markets early, in average seasons, and thus get good prices, and when peaches fail, the Bartlett is a bonanza to the grower. It does well as Standard or Dwarf; the trees grow very rapidly and they come into bearing *very*, *very* early, almost as soon as peaches. Fruit large, beautiful yellow, with a blush in good exposure, sometimes a little russetty; flesh white, fine grained; aromatic, juicy, buttery, with a vinous flavor and highly perfumed. These are certainly many points of excellence, and they are all deserved. Considering its very rapid growth it is a healthy tree and free from disease, blighting occasionally, if on improper soil or improperly cared for, or if the trees have been improperly propagated.

Rostiezer.—Samuel M. Couper, Esq., of New Castle, Del., one of the most enthusiastic and successful amateur fruit growers of the Peninsula, fruits the Rostiezer in his grounds, and I have seen fine specimens of it there, and they taste as well as they look. The tree is vigorous and bears full crops. It comes six weeks before the Seckel, and approaches, but does not equal it in flavor. Mr. Couper also has the *Rutter*, another good pear for the autumn, but does not compare with the Rostiezer in flavor. *Standard.*

Tyson.—Somewhat similar to Rostiezer. A Pennsylvania pear. Fruit medium size; yellow, russetty, and a blush if exposed. Flavor "very good." *Standard.*

Howell.—A Connecticut pear ; to my mind one of the best and one of the worst, because I have had no luck with it, and probably my Maryland soil dont suit it, and I have not tried it in Delaware. It comes in rather late, and does best, I believe, as a Dwarf. Mine are Standards. Fruit large, yellow, russetty, and a blush, if exposed. Flesh melting, juicy, vinous. Its color is its great feature, so purely white when canned, and so, with canners, is a favorite. The tree inclines to blight too much.

Lodge.—From about Claymont this pear comes, and doubtless had its origin in Delaware, on the property of some one of the family whose well-known name it bears, It is a sub-acid pear, medium size, green, brown and russet colors, stalk long, and the fruit is a little swollen at the point. Flesh a little gritty at first, core large, good, rich flavor. A very good pear.

LeConte.—A supposed hybrid of Chinese Snow Pear, with some cultivated variety. This pear has come up from Georgia with a great flourish of trumpets, and has, with the Kieffer, made a charge to carry everything before it. In 1856 it is said to have been sent into Georgia from a northern nursery, labeled, Chinese Sand Pear. It proved not to be the sand pear, but like it, would grow from the cutting. (If you are planting LeConte, plant none but those raised directly from

cuttings. J. J. B.) It grows up like a Lombardy Poplar, and bears very young and abundantly, and the fruit is large, greenish, with rose tinge in extra specimens, with a flavor not "best" by any manner of means. It may do well to can and evaporate, and its size may sell it in northern markets as a table pear. It does well as a standard only, and Parry says, if bud scions are taken from trees budded on the quince to propagate the LeConte pear, such trees will do no good. This, he says, is true of all the oriental pears; don't propagate them from dwarfs. I have watched the LeConte this year on the Peninsula. As to growing, bearing young, bearing large crops, and showing fine large fruit, the tree proved to be all that is claimed for it, but as to the fruit, fine specimens as they were, not a single one of all that I opened but proved to be unsound at the core, and unfit to eat. If left on the trees they did not ripen well and then the softening started, too, at the core. It also blossoms early, and may, on that account, be delicate. I don't condemn this fine looking pear on the result of one season, but I advise peninsula growers not to invest largely in it until it has been further proved. *Standard.*

Bergamotte (Cadet.)—A good pear, buttery, sweet, rich, pale yellow, medium size. *Standard.*

Wilmington.—A seedling of Dr. Brinckle. Tree grows slowly, medium size fruit, green, yellow, russet, aromatic flavor.

Belle Lucrative.—Has a great reputation. I have it standard in Kent County, Maryland, and dont recommend it for peninsula field-culture for profit. The soil don't suit it, and that is the reason I say don't plant it. The pear is peculiar and disappoints often when the soil don't please it.

Duchess. Duchesse d' Angouléme.—Pronounced Doshess-dong-goo-lame. A French pear, found as a seedling in a hedge in France, near Angers. A great, grand pear, and only planted on the quince, and never as standard, as the quality of the fruit is uncertain on them. Fruit large, sometimes uneven, green or greenish-yellow and russetty, and often a beautiful blush, if the exposure has been right for the specimen. Flavor and taste delightful, and needs only to be properly ripened to be appreciated. It needs ripening off the tree and much care is needed, with a cool,dark,dry room and close watching. The tree grows well, and for the first ten years bears large crops of enormous pears. Now just here,one fault of the Duchess pear ; at about ten or twelve to fifteen years of age, it may let up on the size of its fruit,and give you too many knotty small specimens. Here, cultivate freely, fertilize heavily, and cut back new wood and prune severely, and I tell you from experience, the good old Duchess will respond to your call and again make glad your heart. The above treatment will also check the tendency to dropping its foliage prematurely,which it sometimes does.

Buffum.—A New England pear, and a good one on standard or quince. Fruit medium size, deep brown, yellowish-green color and reddish and russetty, sweet, juicy, and of high flavor; and I can recommend it to peninsula growers for field-culture, especially as a dwarf.

Louise Bonne, (de Jersey).—Best as a dwarf only. A very good pear on some soils. From experience I discourage its planting on the penninsula, in field-culture. It don't pay to ship, but evaporates very well.

Boussock.—A Belgian tree, grows well on the peninsula, but, from my own experience, I don't recommend it for field-culture for profit. My trees are standards, fourteen years old.

d'Anjou.—A magnificent pear, and does best on quince only; on a competative examination, before the National Pomological Society, I think this pear received more points for distinctive marks of merit than any other pear. It was introduced into this country by Marshal P. Wilder. It is late, and of course the ripening of it is one of the important points. The tree is vigorous, fruit large, color green-russet-reddish and brown; flesh white, semi-coarse, melting, juicy and perfumed. The north competes with the peninsula too strongly to plant too many of these pears.

Bosc.—A magnificent pear, and when ripened, as have been specimens presented to me by Samuel M.

Couper, Esq., they are surpassed, in all that tends to make a good pear, by few or none, indeed. Its specimens of fruit are usually perfect, and of the highest flavor. It bears its fruit singly and not in clusters. Shape of fruit pyriform, long, narrow neck, and long body; surface smooth and russetted. Stalk one to two inches long, curved, shallow basin. The fruit is rich in flavor, juicy, melting, buttery, with a perfume. The tree grows very slowly, comes into bearing very late, and gives moderate crops; and, for these reasons, I can't recommend it for field-culture. It is a grand pear to plant in handsome grounds for your children, or for your grand children. Must be double worked on quince. Standard.

Washington.—An old and highly prized pear in old time peninsula homes and some are now standing *very*, *very* old. Fruit medium size, red dots, yellow surface, slightly russeted, long stalk, calyx small, shallow basin. Flesh very sweet, too sweet for most persons. Perfumed. Standard. Must be double worked on quince.

Urbaniste.—A pear of delicious flavor, and found to perfection in the grounds of George Z. Tybout, Esq., New Castle Hundred, Delaware, but not to be recommended for field-culture. It is slightly russeted, with a crimson cheek if well exposed to the sun. Standard.

Dix.—A pear of excellent quality, but comes in late, and not to be recommended for field-culture. *Standard*, if on quince must be double worked.

Sheldon.—A superb eating pear. Tree vigorous, moderate bearer, medium sized fruit, and russet in color, and a little blush if well sunned ; of a rich, aromatic flavor. Standard. If we want this pear as a dwarf, it must be what the nurserymen call double worked. The Sheldon won't take on the quince well, therefore this year we bud, on the quince, a pear that takes well on it, and let it grow to next spring, and then cut it off a few inches above the quince and bud the Sheldon on this pear stock, and it takes, after all this time and trouble, and makes a good but high priced dwarf tree. Double worked trees are not, as a rule, long lived.

Rutter.—Spoken of under Rostiezer. This pear bears its fruit like strings of onions, and such pears, as a rule, only bear good crops every other year.

Butter Pear.—An old fashioned, popular fruit, for family use on the peninsula. Cracks badly in field-culture, and is not desirable.

Clairgean.—A large, handsome pear, reddish brown and cinnamon towards the sun. Flavor variable ; not always good, and not desirable for field culture.

Seckel.—Without doubt the most luscious and exquisitely flavored pear that grows on the Peninsula. Fruit small, skin russeted and greenish, and often a blush on the cheek, where it greets the rising sun. The most

beautiful of Pear trees. Rather a slow grower when young, and late coming in, but after it does come in, it bears large and regular crops. It must be regularly and thoroughly tilled and fertilized if we want fine specimens. In yards, isolated trees do well in grass, if they have a moist, rich soil, but in the field they need high culture.

Kieffer.—This pear has made a sensation in the pear world; has been sent out by interested growers with a great flourish, as blight-proof, and the finest looking, most elegant, most luscious pear the light of sun ever shone upon. It should, according to Parry, be spelled "Kieffer," and then according to German rules should be pronounced Key-fer. Thomas spells it Keiffer and then it should be pronounced Ky-fer. I believe the originator spells his name as Parry has given it, and I call the pear Key-fer. Fruit large, oval, swollen out in the middle, and contracting to a conical shape at each end. When ripe, is a beautiful yellow, and with a lovely blush of red towards the sun. Really a very handsome pear. Flesh coarse, as a rule, in some specimens, fine, and the best of them are only poor as an eating pear. Ripens late in the Autumn. Tree a *very*, *very* vigorous grower and bears large crops when very young. At four years' old my largest standards picked a basket to the tree. Now as to the uses of this pear. It is beautiful for decorative purposes, and, I have no doubt, will do well to can and to evaporate, too. As to its eating qual-

ities, I see one good authority quoted as saying, it was surpassed in lusciousness of flavor, or some such expression, by no pear he had ever eaten; nonsense; that man's enthusiasm had run away with his judgment. It will never sell on its merits as an eating pear, but I believe it will be a profitable pear to raise in moderation, on the Peninsula, in field-culture, both as Standard and Dwarf. *It is not blight-proof.* I have seen the Kieffer blight; and believe, as now propagated, it *will* blight, and probably freely.

It is supposed to be a hybrid from the Chinese sand pear and Bartlett. The original tree is in the yard of Peter Kieffer, Philadelphia, and was planted in the year 1868, and is, therefore, eighteen years old. I have no doubt the trees propagated directly from Kieffer's tree may be blight-proof, for I have confidence in raising blight-proof trees from healthy stock, but the Kieffer pear trees now put out, budded or grafted on Seedlings raised from seed of, we don't know what kind of pears, are not blight-proof, nor is any other pear so propagated. To check blight, we want to commence right here at the seed, and sooner or later we must do it. They claim for the Kieffer that it is a very strong and rapid growing tree; true. That it is the least liable to disease; doubtful. That it is best adapted to all climates and positions; this may be true. That it is the earliest bearer; this may be true. That it is the most productive; this may

be true. That it has no off-years in bearing ; probably true. That the fruit is large and well colored ; true. That it keeps well ; probably true. That it cans well and ships well ; probably true. That it sells at the highest market price. It sells well as a novelty, I admit. I say plant some Kieffer's, they promise well. I will close this description with a paraphrase of Moore's well known couplet, which expresses exactly my idea of the eating qualities of the Kieffer pear.

> "Extol it, ripen it, just as you will,
> The taste of the sand pear will hang round it still."

Garbers Hybrid.—A hybrid pear from Columbia, Pennsylvania, crossed on the Chinese sand pear, or supposed to be. Not well known.

Lawrence.—Next to the Bartlett, this is probably the most valuable pear for Peninsula field-culture ; originated on Long Island. Tree very hardy, and rarely, if ever, blights, Grows well but straggling. Bears early and abundantly. Fruit medium size, very smooth and regular. Color, when ripe, lemon yellow, and with some, russet and brown. Stalk medium and calyx open. Flesh white, juicy, sweet, with an exquisite aromatic flavor and aroma. If I planted any Standard pear tree for field-culture, it would be the Lawrence, but the Dwarf does very well indeed, as I have said before in another part of this book. The Lawrence can be kept until Christmas

in this latitude. It bears every year, but the crop is heaviest, as a rule, every other year. It must be watched closely in the detention house, and if you see a small, black speck near the calyx or blossom end of the fruit, that pear is not going to keep, and should be marketed at once.

Vicar of Winkfield.—A late pear, for cooking and preserving. Every tree blights and communicates it to other trees in the orchard. Never touch it to plant on the Peninsula, and I would like to see every tree of this variety now planted here, dug out, root and branch and burned. The finest specimens I ever saw were grown by John Bacon on Union street, New Castle, on an isolated tree in a grass plot. Like most isolated pear trees it appears to thrive whether cultivated or not.

Winter Nelis, Standard. If on quince, must be double worked; a Flemish pear and highly esteemed, North. On the Peninsula, it drops its foliage, and is not satisfactory. A grand winter pear where it grows well, and I recommend its further trial here.

Easter.—A very late winter pear, not much tried here, and ought to succeed, but is not sure as to quality or quantity. It is very fine in the spring when well ripened. Yellow, green, brown and russet. On quince, only.

Sha Lea.—Chinese sand pear which is supposed to have produced the Kieffer, having been fertilized by the Bartlett. Medium size, round pyriform, greenish yellow with russet markings. Is not a choke, but yet has no pear flavor, and is only a little better than the quince, to eat. Is a good pear to preserve.

Suet Lea.—Chinese snow pear, and is supposed to have produced the Le Conte, having had its blossom fertilized by one of our native pears. Is mnch iike *Sha Lea.*

Daimyo, Mikado, Cin cin cis—Are all Japanese pears, much like the Chinese sand pears, but generally ripen later and are only fit for cooking.

Hawaii.—Sandwich Island pear, and probably after the style of the Oriental pears.

If rabbits trouble your trees, rub each tree two feet, from the ground up, with a piece of raw liver, once in two weeks. Blood frightens rabbits. For mice, throw a mound of pure earth about a foot high around each tree, and after each snow, tramp around the trees. Remove the earth in the spring. If a tree be girdled by mice or rabbits, graft the end of small twigs or branches below the girdle and carry the other end up and graft in above the girdle. Several of these may be necessary for a large tree. If an old tree you wish to save inclines to fall, plant a young pear tree each side, a foot or two from

it ; when the young trees are well rooted, cut off the tops and graft them into the trunk of the tree you wish to save, and it will begin to derive sustenance, and support too, from the new trees as soon as the grafts take.

Chapter XIII.

THE PROPER LIST OF VARIETIES FOR DIFFERENT KINDS OF ORCHARDS.

For a Peninsula family orchard of fifty Standard trees.

Lawson or Comet	1
Summer Doyenné	2
Manning's Elizabeth	5
Ott	2
Bloodgood	3
Rostiezer	3
Tyson	2
Bartlett	10
Howell	2
Bosc	1
Sheldon	2
Rutter	1
Seckel	3
Kieffer	3
Lawrence	8
Winter Nelis	2
Total	50

This list will give pears from early summer to early spring. I omit Madeline because it blights so badly. I put in Rostiezer for its Seckel-like flavor, and Rutter for its good quality and productiveness, and Howell for its beauty, preserved or canned. I add Bosc for my personal admiration of the fruit, well ripened, and Lawson as a novelty. The others go in on their known merits.

A Standard pear orchard of two hundred and fifty trees for the production of fancy specimens of the fruit.

This orchard must receive the highest culture of every kind, and the owner must even sit up of nights with it, if he wants to shine at the "Fair."

Lawson or Comet	5
Summer Doyenné	20
Manning's Elizabeth	20
Sugar Pear	5
Ott	5
Dearborn's Seedling	5
Bloodgood	10
Julienne	5
Bell	5
Bartlett	34
Rostiezer	10
Tyson	5
Howell	10
Le Conte	5

Belle Lucrative	5
Boussock	5
Bosc	5
Urbaniste	5
Sheldon	10
Rutter	10
Seckel	15
Kieffer	10
Lawrence	30
Winter Nelis	10
Sha Lea	1
Total	250

An orchard of one thousand Standard pear trees for Peninsula field-culture for profit.

Lawson or Comet	25
Summer Doyenné	50
Manning's Elizabeth	25
Bartlett	400
Seckel	25
Kieffer	100
Lawrence	375
Total	1000

A family Dwarf pear orchard of fifty trees, for the Delaware and Chesapeake Peninsula.

Lawson or Comet	1
Manning's Elizabeth	2

Bartlett	12
Howell	5
Duchess	5
Buffum	3
d'Anjou	5
Kieffer	2
Lawrence	10
Easter	5
Total	50

Wm. Parry says be careful how you buy the Kieffer Dwarf, and that no Kieffer tree, *Standard* or Dwarf, must be budded or grafted from a Dwarf tree, as the quince is fatal to the proper propagation of all Oriental pear trees. Others deny this.

A Dwarf Pear orchard of two hundred and fifty trees, to give fancy specimens of fruit. This orchard must receive every attention, and the very highest culture in every detail.

Lawson or Comet	10
Manning's Elizabeth	20
Bartlett	50
Howell	50
Duchess	50
Buffum	20
d'Anjou	20

Kieffer	20
Lawrence	50
Eastern	10
Total	250

A Peninsula Dwarf Pear Orchard of one thousand trees, for field-culture, for profit.

Lawson or Comet	25
Mannings' Elizabeth	50
Bartlett	500
Buffum	50
d'Anjou	50
Kieffer	25
Lawrence	300
Total	1000

When you come to plant your orchard you will find much said, in nurserymen's catalogues, and other places, about planting Standards and Dwarfs together—such as Standards thirty to forty feet apart and a row of Dwarfs between—*don't do it.* The Standard and Dwarf Pear-tree demand entirely different culture and treatment, and they should be planted in blocks entirely separate and distinct.

THE SOIL AND SITE FOR THE PEAR ORCHARD.

The very best soil for the pear is a strong loam with some sand, and a porous, open, clay sub-soil, red or

yellow. The sub-soil must be dry, and should not be over forty feet to water. The pear will adapt itself to almost any soil, but it won't thrive in all soils. Don't plant your pears in a wet soil unless very thoroughly surface-drained, and under-drained; and a soil too deep and rich may force the trees, give premature wood, and this wood will not stand fruit-bearing. I should prefer an unprotected northeastern exposure, or, really an unprotected exposure all around, with the site as level as possible to give good drainage. I believe an unprotected pear orchard has the best chance for its bloom to escape early spring frosts, on account of the backening of the blossoms. Yet I believe this question of clear exposure needs close study, as I have seen some orchards do wonderfully well, and keep especially free from blight, where they had been thoroughly protected on all sides, except the southeast. Any one wishing to protect an orchard can do it by peach trees twenty feet apart, or by evergreens, or by osage orange, or more profitably, perhaps, by the d'Amalis Pear planted as a hedge four feet apart. The soil and aspect for the orchard will be also suitable for the nursery soil. In cultivating nursery stock they should not be forced too much, and should not be manured by green manures, but all fertilizers that are applied should have passed through the fermenting stages. Water near the pear orchard, I think an advantage, and especially fresh

water, for this will freeze and reduce temperature. Water to northeast to east is best.

WHEN TO PLANT.

On the peninsula, plant pears in fall or spring, really a matter of convenience. If you plant in the fall, begin Nov. 1st, sure, as you will avoid early cold, and your trees will get well packed by rains before freezing weather comes upon them.

DISTANCE APART FOR PEAR TREES, STANDARDS AND DWARFS, WHEN SET IN THE ORCHARD.

Standard trees should be set thirty feet apart each way, and Dwarf trees should be set ten feet by fifteen feet, although many set them ten feet by ten feet, which is too close. Twelve feet by twelve feet is better than ten by ten ; and many sucessful growers plant twelve by twelve. As I have said before, never plant Standards and Dwarfs together ; put them in separate blocks.

TO PLANT STANDARDS.

Plant so as to expose the fruit as much of it as possible to the rising sun. Do this, also, with any other fruit tree and you will get the best color. Dig the hole deep enough to take the tap-root straight, and wide enough to take the laterals without cramping, and also make the hole deep enough to plant the tree as deep as it was in the nursery. Now set the tree, fill up one-third with soil and tramp well, seeing that the roots are

right; now fill up another third with soil and tramp well, and now fill up entirely and tramp well, and lastly, throw a little soil as a small bank around the tree. It will be seen here no sub-soil has been used; we take the soil from the ground around the tree, and then scatter the sub-soil in its place. Before we plant the tree we should cut off clean, all broken or bruised roots, and all broken or bruised limbs.

Planting the Dwarf tree differs somewhat in method from planting the Standard tree. Dig the holes as for Standards and plant in the same way, except, set the Dwarf tree not more than five, and not less than three inches below where it has been grafted to the quince. Now the pear stalk will throw out first, hair roots, then rootlets, and at last, full roots, and the tree will become a-half Standard, and be a better tree, stand up in storms better, and live longer than with the quince root alone. Some growers, in order to urge the starting of the pear roots, nick the bark of the pear-stalk in one or more places before setting. The argument is that nature will then become active here to repair the wound, and, hence, a root will grow sooner at this point; or, if the Dwarf pear tree don't grow well after a year or two, scratch the dirt away from the roots and slit the bark in a few places and replace the dirt; then the pear roots will start. Now we have the orchard planted; what shall we do with it until it comes in? In Standards, plant a

little corn, or potatoes, or raspberries, and in Dwarfs you may do the same, or cabbage, beans, and some garden crops. I object to cropping young fruit orchards to any great extent. They, as a rule, require all the plant-food present, and are not able to share it and thrive themselves. Whatever you plant among young pears, don't plant strawberries.

PRUNING THE STANDARD TREES.

One year old trees from the nursery don't want much cutting when planted, as a rule, unless the tree is too long, then retrench it to three or four feet. If two years old when set, the best start is for a pyramidal tree ; and here, retrenching the top somewhat will start a better sap-flow to the lower branches. Each lower branch should be kept a little longer than the one above it. Watch, in pruning, the position of the buds ; don't cut too near them or the branch they form will be weak. If you want a shoot to run directly upward, let the bud be on the inside of the shoot. If you want a limb to run in or out, select the bud on the side you want the shoot to grow. When a young tree is set, trim off the limbs to the number of one to every three, and here again, let each limb extend a little within the one under it. Three years of such training will be about all that is required for Bartletts, Duchess, and such sorts as naturally go to pyramidal growth, in field-culture. The Lawrence and Winter Nelis, and such kind, need longer

attention, as they grow their limbs in a straggling way.

After the primary training of standards, we only keep the middles clear to let in the sun, and retrench if the trees bear too much wood,or trim again, as they say, for fruit. Trim pears in the spring or late winter for wood. If for fruit, prune in the summer. Above all things don't be too active in cutting your Standard Pear Trees, at any season. The wounds made by pruning had best be painted over by Copal Varnish, or common lead paint, or covered by grafting wax, especially if such wounds are extensive. I believe the usual custom on the peninsula is to trust them to nature, and I have not often seen bad results.

PRUNING DWARF TREES.

When you set out a Dwarf Pear Tree, if in the Fall, let it remain until the coming spring, and then cut off the top (if it is a one year old tree) to within from eighteen inches to three feet from the ground,depending on the size of the tree. Cut off lateral branches if any. For a two year old, cut by the rules given for Standard. As the Dwarf grows rapidly and receives high culture, it makes wood rapidly, and often it is well to cut back the new wood of the year one-third to one-half, before growth starts in the spring, and thus improve both the tree and the fruit. Do this until the trees are four years old. Dwarf trees, as a rule, start off better than Stan-

dards. I have planted eight hundred Dwarfs at one planting, and never lost one. In an average season, twenty-five dead, out of one thousand Standards planted, would be doing fairly well.

Chapter XIV

Cultivating the Pear Orchard.

The Standard Orchard.

Before speaking of cultivating the orchard, I will refer to one point, It does not pay to top-graft an apple orchard after it is thirty years old, but pear trees are much longer lived, particularly Standards, and while there is life in the root of a pear tree, bad or good, it is worth caring for and grafting. Cut off the tree, and the stump will send out suckers ; bud or graft these and you may get a good tree ; also, you can top-graft old pear trees, say one-third the tree each year, and thus change them, and in the same way you may top-graft younger trees.

The pear needs high culture, as a rule, and especially, Dwarf pears. In 1871 there were supposed to be on the Peninsula, fifteen thousand pear trees. It is all conjecture with me, but since that time, say there have been planted on an average fifteen thousand trees per year. Now, from 1871 to the present time, say

ninety thousand pear trees have died, from various causes ; at this rate there may still be one hundred and forty to fifty thousand pear trees still living. Certainly such mortality shows the pear to be a tree requiring great and extraordinary attention. The pear is a regular bearer ; fails, I should say, not oftener than once in ten years, and, with extra care, even this off-year may prove fruitful. The Peninsula pear crop may now reach, as a yearly average, seventy five thousand baskets, but, like all my statistics, this is conjecture, for I can get no date ; not even from the Census Bureau at Washington.

As to the cultivation of the pear orchard, when determined not to keep it in sod, plough not over four inches, in the middle of the rows, and throw a furrow to the trees. After a day or two plough again, very shallow, and throw the furrows back to the trees. Now harrow, and then keep the cultivators going not over two inches deep, until the fruit, bending the limbs down, interferes with the progress of the horses. This will be from the 20th of June to the 1st of July. Some plough in the fall, saying it destroys the pests preying on the trees, and prevents them from coming next year. It, probably, don't destroy many such and makes the growth of new wood too succulent, which may be likely to blight next year. This same trouble comes, I feel assured, by fall fertilizing too, especially with green

manures. All pear trees, especially after they have become 10 to 12 years old, have great mats of roots, rather superficial ; so now at this age and after it, unless your trees are making too much wood, and you wish to root prune them ; watch your ploughing very closely and make it very shallow.

Shall we cultivate Standards every year? Watch them well, so long as they do well ; make strong non-succulent wood and plenty of it, and bear good fruit and large crops ; cultivate them yearly. If making too much wood, and it succulent and not firm, and inclined to blight, throw your trees into sod. Now watch them closely ; if the wood stops growing, and the fruit becomes knotty and small, as it is very apt to do, then plough up the orchard in the spring, sow down to clover, and the next June a year, turn this clover under ; and after that, cultivate every year until trouble comes again. The only objection I have to turning down green clover in June is, that in fermenting, it may prove a nidus for bacteria, like green manures in general, so I would watch this plan and see if it was followed by excess of blight.

THE DWARF PEAR

needs, certainly, thorough cultivation, and that every year, just as directed for Standards.

If your trees are not doing well, see if they are

being forced too much, by examining the length and quality of the new wood, and also watch if fruit is lessening from the trees going to wood. If that is found to be the case, I would cease cultivation for one year, or two years at most, and in its stead mulch the whole orchard with three tons to the acre of straw, salt hay, or some such material. Now, at the end of one or two years, as the case may be, plough up the orchard in the spring, sow down to clover, and then, the following June a year, plough under the clover, and then from that time go on with high cultivation and high fertilizing, until similar circumstances demand a change. It may also be necessary to watch the new wood, and at times if of too free growth, cut it back.

The Standard orchard, whilst in sod, may be mulched around trees and fertilized on the sod; or either may be used alone.

FERTILIZING THE STANDARD PEAR ORCHARD.

RULE 1.

For trees of a bearing age:—Should the longest shoots of new wood measure 18 inches, and the medium shoots 12 inches, and the shortest shoots 8 inches, giving a general average of $12\frac{2}{3}$ inches, and should the fruit spurs, (I mean the fruit spurs proper.) average not less than one and a-half inches in length, and look robust

and hearty, with good color, for such trees no fertilizing is needed for the coming crop of fruit.

Rule II.

Should the general average be reduced by, say three inches, and the fruit buds reduced one half inch—with lack of healthy color and plumpness—then the tree needs phosphoric acid and potash for the coming crop of fruit.

Rule III.

Should the general average of Rule I be reduced by from four to six inches, and the fruit buds be stumpy and shrunken in appearance, then the tree needs phosphoric acid, potash and ammonia, and probably some iron, in order to mature well the coming crop of fruit.

For fertilizing Dwarf Pears, the same rules may be applied, reducing the general average of new wood, say, three inches in Rule I, two inches in Rule II, and one inch in Rule III, and allowing the fruit spurs to remain without alteration.

The Standard pear needs fertilizing on good ground, certainly, not every year as a rule, and I should say a good dressing of potash, phosphoric acid, ammonia and some iron, perhaps, applied every three to five years should be sufficient ; still, in all this you must be guided

by your examination of each tree, and then apply your rules. If the tree comes on to spring from a late, wet and warm autumn, with a large growth of succulent wood, then you must make some exception to Rule 1, for to mature this wood an extra dose of fertilizer may be needed, or all this boggy, sappy wood may be attacked by blight in the warm weather of the following summer. The fall of 1884 made poor wood and little of it, and the trees, generally, needed fertilizing in the spring of 1885. The fall of 1885 has made much wood, as a rule, on good trees, yet I don't think it sappy and succulent, because the whole tree has prospered, and the wood-outlook and fruit spurs give promise of a good crop in 1886. If a tree has been badly mutilated in cutting off blight, then fertilize that tree well, for it wants extra food to make up for its loss of substance ; it wants new blood and plenty of it. I believe rather in individual fertilizing of pear trees ; keep a record of poor bearers and try and force them. Apply the fertilizer around the tree in the spring as far as the branches extend, and apply what the tree demands by the rules given. Don't put strong potash right at the root of young trees, but after they have borne a crop, all may be applied right at the roots ; probably some care may be necessary in using pure muriate of potash.

I am not in favor of using as a fertilizer on pear orchards, either lime as generally used in agriculture, or

green manures—manures in which fermentation is still going on. The reasons for this have been given when speaking of the diseases of the peach, and will be referred to again when I come to treat of the diseases of the pear. The pear, like the peach, needs phosphoric acid—potash, ammonia, and sometimes iron—and these, with chlorine, may be applied in many shapes. The prepared or artificial fertilizers, come in all shapes, and are to be preferred. I like kainit, applied just as I have recommended for peaches—and as there, we may mix it with acid phosphate, one quarter or even one-half its bulk, or weight, and apply broadcast or by drilling, after ploughing in the spring, and then harrowing it in. Use as much as you choose for pears, 200 lbs. to 1000 lbs. per acre, as occasion may require. Use muriate of potash alone—3 to 5 lbs. to 10 lbs. to the tree, applied in the spring, and harrowed in—or apply the potash mixed with acid phosphate, 125 to 200 lbs. to the ton, and drilled in in the spring, 200 lbs. to 1000 lbs. per acre. Any good phosphate may be used, containing phosphoric acid, potash and ammonia, drilled in in the spring, after ploughing and harrowing, 200 lbs. to 1000 lbs. per acre. Bone meal is good, but I prefer it undivided, as it acts quicker. If you think your trees need iron, apply it as in peaches. Sometimes liquid manures ; these same fertilizers dissolved in water and applied little and often, may be used with good effect to force large specimens of

fruit, but we can't carry this out in practical field culture. Rain water, light, heat, etc., all do their part in growing the pear, and have been explained in their relations to growth, when we were speaking of the peach. In fact, the fertilizing of the pear differs very little, if any, from the fertilizing of the peach, and as all this has been fully treated of under the head of the latter fruit, nothing more need be said here.

For formulæ for fertilizers, see those given for peaches. They are all equally useful for the pear, and are to be applied to them in the same way, and in the same quantities, more or less, as to peaches.

Salt is good applied to pear trees as a fertilizer. It gives chlorine, etc., and is detrimental to the slug and other pests. Formerly, I used it to a considerable extent, but since kainit has become cheap and obtainable, I rely, generally, on the salt contained in it.

TREE WASHES FOR PEARS.

Use the washes recommended for peaches; also, one pound caustic potash to one gallon water. Apply with a whitewash brush late in March, or in April. This is too strong for buds and small twigs.

Another: Caustic soda, one pound, water, one gallon. Use as the other wash. This may touch the buds and small shoots, and will, probably, not injure

them. These washes act as fertilizers and pest destroyers. The same variety of pear varies very much in different soils, and because a variety is not fine on the Peninsula, is no reason it may not be good in New England, although there are few varieties that will not flourish and give good flavor, size and color here. Should any be found deficient, study them well and experiment with fertilizing them, and you will, doubtless, be rewarded by good returns. The cracking of fruit is usually produced by a fungus, and will be treated of under enemies of the pear. Should the cracking be noticed as the pears mature, apply salt around the base of the tree, a pint or quart to the tree.

Chapter XV.

DISEASES AND ENEMIES OF THE PEAR.

The diseases and enemies of the pear are many and various, and I shall take them up and treat of them in the following order :

Blight :
- Fire Blight,
- Twig Blight,
- Frozen Sap Blight.
- Frost Blight.
- Insect Blight.
- Leaf Blight.
- Blight of Fruit.

The Slug.
Bark Lice.
Scale Insects.
Curculio.
The Elements.
Starvation.
Overfeeding.
Cracking of the Fruit.
Decaying of the Fruit.
The Borer and other Insects.
Premature Shedding of Foliage.
Frost,
Cracking of the Bark.

Before going further I will give an analysis of the heart wood, the sap wood, the bark and the fruit.

Analysis of the Heart Wood.

Potash	27.00
Soda	——
Lime	23.14
Magnesia	3.00
Sulphuric Acid	0.45
Phosphoric Acid	10.40
Phosphate of Iron	.80

Analysis of the Sap Wood.

Potash	22.25
Soda	1.84
Chlorine	0.31
Sulphuric Acid	0.50
Phosphate of Lime	27.22
Phosphate of Peroxide of Iron	0.31
Carbonic Acid	27.69
Lime	12.64
Magnesia	3.00
Silex	0.30
Organic Matter	4.02

Analysis of the Bark.

Potash	6.20
Soda	——

Chlorine	1.70
Sulphuric Acid	1.80
Phosphate of Lime	6.50
Phosphate of Peroxide of Iron	——
Carbonic Acid	37.39
Lime	30.36
Magnesia	9.40
Silex	0.42
Organic Matter	4.18

Analysis of the Ash of the Pear Fruit.

Potash	54.70
Soda	8.32
Lime	7.97
Magnesia	5.22
Sulphuric Acid	5.66
Silicic Acid	1.49
Phosphoric Acid	14.31
Phosphate of Iron	1.96

All these analyses will be seen to be of importance when we come to treat of the remedies for the diseases of the trees, and are useful to refer to when reading of fertilizing the trees, and might have been given in that Chapter.

The first of the diseases of the Pear to be treated of is blight, the scourge of scourges with which the pear is afflicted.

FIRE BLIGHT.

This form of blight comes rapidly, and is a sudden withering of the wood and bark, preceded by the blackening of the leaves, and may confine itself to one or more limbs, or involve, rapidly, the whole tree.

The part of the tree left not affected, is apparently in perfect health. The first attacks of *fire blight* come with the first hot weather, yet in the spring, the bark, if thoroughly examined, will show dry, dark spots, and the sap will appear thicker than natural. Heretofore this form of blight has been supposed to have been caused by a wet, warm autumn forcing a large amount of succulent wood, and this wood not being matured, falls an easy prey to blight on the advent of hot weather. I will give my ideas of its cause further on.

TWIG BLIGHT

is about the same disease as fire blight, affecting leaves and twigs only.

FROZEN SAP BLIGHT.

Symptoms are, in the spring, thick sap, wood rather dryer than natural when cut across; dead, dark patches of bark on the branches. The parts affected shrivel and turn black on the approach of warm weather. The heartwood will be found dead below where the outside bark appears healthy; so in cutting you must go several inches below the apparent dead wood. Downing accounts for

these severe forms of blight as follows, but he does not go far enough to find the real cause: In every tree there are two currents of sap, one up, through the outer wood or alburnum to be digested by the leaves, the other downward, which descends through the inner bark or liber, forming a deposit of new wood on its passage down. Now the summer before the tree blights, is followed by a damp and warm autumn preceding an early and severe winter. The summer was dry and the wood growth was completed early, but the damp, warm autumn forced the tree-wood to a second growth, which continued late. Now while the sap vessels are still full of their fluid, a sharp freeze comes, and this is repeated for several nights, followed in the day time by bright sun. The descending current of sap becomes thick and clammy so as to come down with difficulty; it chokes up the sap vessels, freezes and thaws again, loses its vitality and becomes dark and discolored, and in some cases so poisonous as to destroy the leaves of other plants when applied to them. Here, along the inner bark, it lodges and remains thick and sticky all winter. If it happens to flow down until it meets with any obstruction and remains in any considerable quantity, it freezes again beneath the bark, ruptures and destroys the sap vessels, and the bark and some of the wood beneath it shrivel and die. In the coming spring the upward current of sap rises through its ordinary channel, the outer wood or alburnum, the leaves

expand, and, for some time, nearly all the upward current being taken up to form leaves and new shoots, the tree appears flourishing. Toward the beginning of summer, however, the leaves commence sending the downward current of sap to increase the woody matter of the stem. This current has to pass down through the inner bark or liber along which still remain portions of the poisoned sap, arrested in its course the previous fall. This poison is diluted and taken up by the new downward current, distributed toward the pith and along the new layers of alburnum, thus tainting all the neighboring parts. Should any of the adjacent sap vessels have been ruptured by frost, so the poison thus becomes mixed with the still ascending current of sap, the branch above it immediately turns black and dies, precisely as though poison had been introduced under the bark. In a note in Downing, he quotes Duhamel as saying: The sap corrupted by putrid water or excess of manure, bursts the cellular membranes in some places, extends itself between the wood and the bark, which it separates and carries its poisonous acrid influences to all the neighboring parts like a gangrene. Now these descriptions are graphic and true to nature, and the causes given are plausible as far as they go, indeed, I believe are true, but they just stop short of the real cause, as will be seen further on. Pears which mature their wood early, as the Seckel and Duchess, making short and firm joints, are the pears

which are freest from blight, as will readily appear from what has been said.

FROST BLIGHT

does not differ from the blight we have been speaking of.

INSECT BLIGHT.

In May and June, shoots at the ends of branches, extending not beyond the wood of two years growth, turn dark in color, and the leaves soon turn black, and the wood becomes shriveled and very hard. Where this blight starts, or near it, will be found the cause. It is caused by the egg of a beetle, (Scolytus Pyri,) deposited there the year before, in July. The beetle is small, deep brown, with light brown limbs. Thorax short and studded with bristles. The wings have punctured points, and between these points are rows of bristles. The egg, having been deposited the year before, hatches either then, or next May or June, on the Peninsula, and then the small grub or larva bores through the sap wood, going in at the root of a bud, and burrows toward the centre of the limb. The branch dies beyond the burrow, and we have insect blight. The grub now completes his transformation and passes out, and we have the beetle again, as heretofore described, and on it goes to lay its eggs, and thus with it the wheel of nature revolves.

LEAF BLIGHT

has been spoken of in connection with nursery stock, and comes from crowding the trees, and may be avoided by thinning them. It checks the growth of the trees for the year. A fungus is often found on the leaves, and is supposed to be a cause, as it is also of *cracking of fruit* in certain varieties, in certain localities.

BLIGHT OF FRUIT.

The pear fruit, at times, fails to perfect itself, and blights before it is of sufficient size and flavor to eat, and this is entirely distinct from natural decay. It may attack the pears of any tree, and in any place, and under any circumstances. This blight is caused by the presence within the pear of Entozoa—Parasites, (animals or vegetables living within the bodies of other animals or vegetables. When the fruit is nearly matured, it pits and softens under the skin, and an internal rot begins, and the fruit decays, rots at the core. Now, this is often found coming on good pears, and I suspect the LeConte of it in some Peninsula soils. If you can't gather and dispose of the fruit for cooking purposes before the trouble commences, you will lose it all. As the pear gets soft and watery, the parasites come to maturity and move about. Put a portion of the pear pulp in muslin and press it, and take a drop of the juice that exudes, thin it with water, and put it under the microscope, and

you will see the little snake-like bodies moving about and feeding on the mycelia present in the fluid with them.

Now, having described the different kinds of blight affecting the pear, we come to treat of its cause. What is the cause of blight? As in yellows in the peach, I believe the cause of each and every form of blight in the pear to be bacteria, and I believe that blight flourishes most in land that has been enriched by lime and green manures, stable manure, barn-yard manure, hog manure, and all green matters which have to go through fermentation before being resolved into their elements, and before they can become food for plants and trees. I believe such land with such surroundings furnishes the most inviting territory for the proliferation, so to speak, of these bacteria, and with the crowding of trees into this territory, we have here every element for their production, for their endurance, and for their life-work. For a description of these animals, or vegetables, as they may be, I refer the reader to the chapter on *Peach-Yellows*, where he will remember they are described. Now when we were describing Fire-Blight, Frozen Sap-Blight, etc., had we but added and adduced these bacteria as the cause, coming in the sap, under circumstances rendered favorable by succulent growth, freezing, by the irregular seasons, and by the heat of spring and

summer, we should have had the story of the Pear-Blight of every kind in a nut shell. We take the healthy Pear tree. In this tree there are bacteria, as there are in all healthy trees. Now, for some of the reasons mentioned, perhaps, or for others, these bacteria increase, millions and millions and thousands of millions, in a few hours. Now follows a great stirring up, a fermentation ; heat is increased, and the sap, instead of being good, rich, healthy blood for the tree, is hot, with the fever produced by the presence of these disease-germs, for such they now are. The digestion of the tree, the changing of starch into sugar, the action of the chlorine on the leaves, etc., is all interfered with, and for reasons of their own, these bacteria congregate in one limb or two limbs, (just as in man, under similar circumstances, one toe only may become gangrenous,) and congregating here, the attacks are so fierce and concentrated, that all molecular change is checked, and hence, with this stoppage of cell-action comes gangrene, *death*. In a healthy tree these germs probably assist the change of starch to sugar, and only are pests when increasing rapidly and infinitesimally as they do in diseases of animals or vegetables. In Peach-Yellows there are enough to sicken the tree, in Pear-Blight they come in sufficient numbers to overwhelm and destroy at once, and appear elective as to their choice of location, not distributing themselves over the whole tree, but select

their home in one or more branches and here cause a very boiling of the sap. Blight was absent, or very rare, on the Peninsula until we commenced to crowd in Pear trees, and then, just as with human beings, the minute they were crowded, zymotic diseases (bacterial, or fermentative diseases) appeared, and here is a decided proof of its germ origin. If we starve trees we may get blight, just as when we crowd and starve numbers of human beings, we have typhus fever, measles, typhoid fever, and other zymotic diseases, breaking out among them. If we over-feed trees, we may get blight just as we get cholera, or, cholera morbus, at least, in man. In seasons of changing temperature, of thunder storms, of very sudden changes from heat to cold, and *vice versa*, we know pear-blight thrives, and under just such circumstances, we know bacteria increase and multiply, and all this is an evidence to me of the bacterial origin of this curse on the Pear tree. The peculiar bacterium which causes blight has been claimed to have been found by Prof. T. J. Burrill of the Illinois Industrial University. He calls it the "*Micrococcus Amylonovus*," and gives some description of it which I have not at hand. Now given the peculiar germ that causes the trouble, the next point is to experiment practically with it. These germs can all be increased indefinitely in number by artificial culture, in such menstrua as beef-tea and gelatinized solutions and such, and they

should be so cultivated, and their habits studied. They should be inoculated into healthy pear trees, such as the Seckel and Duchess, which rarely, if ever blight, and then, again, into the Vicar and Clapp's Favorite, which almost always blight, sooner or later. The leaves and fruit, as well as the bark of the trees, should be inoculated, and the results watched and studied, and by these means we might get at once the history, habits and life of the disease-germ and a remedy against its ravages. Who is to do this? Who can, but the State or National Government? This matter will be referred to further on. This pear tree blight is certainly a local fungus, and may be be developed by any one of a number of causes. As when the wood don't ripen well the previous year, and then, next summer, with high temperature, with the wood-acid and nitrogenous matter present, here will be the soil for the development of the blight fungi, or, of one of them, for I believe there may be a number coming under different circumstances. Stagnant water contains germs and breeds them, that may enter the pear-roots and cause blight, and hence, drainage must be attended to in the pear orchard, and hence, a sandy loam, well drained, is good ground for pears.

REMEDIES FOR PEAR BLIGHT.

To remedy any disease, find out the cause and remove it. If we have found out *this* cause, it is our

place to study it, experiment with it, and do all we possibly can to arrest its ravages.

Science is progressive. I don't despair of success, and I believe we are now on the right road to accomplish not only in the vegetable world but in the animal, the destruction of the right hand weapon of the fell destroyer, the invisible, but mighty disease-germ, and I further believe that the day is near at hand when each zymotic disease will be known by its own peculiar form of microbe.

The great starting place to prevent blight is in the seed. Our seedlings, as now raised, are, doubtless, grown from seed taken promiscuously from budded fruit of all kinds, and are grown in land, perhaps, contiguous to orchards containing trees more or less blighted. The buds and grafts for these seedlings are taken from trees growing among trees diseased as well as healthy, and what can we expect as a result? Certainly only trees that will grow up with delicate constitutions, produce succulent wood, and holding out inviting hands for an early attack of blight. Trees should be raised from the seed of the wild, or common choke pears, and buds and grafts should be obtained, in turn, only from trees raised from the proper seedlings. If the National Agricultural Department, at Washington, would devote some of its talent and money to the supplying this country with healthy seedlings for the pear, and also

healthy grafts and buds, it would be doing work worthy of the gratitude of the whole country.

If pear land is damp or wet it should be drained, and thus the chances of blight will become less.

As to shelter, I, as I have said before, prefer an open site for the pear orchard, but H. H. McMullen, Esq., of New Castle Hundred, has a pear orchard of about fifty trees or more, probably 25 years old; they are sheltered by his house, by pine trees and farm buildings on all sides, except the southeast. These trees have always borne excellent crops, and I believe there has never been any blight in them. There are both Dwarf and Standard trees, and some of them are of varieties that blight frequently in other places. I think this is the most satisfactory little pear orchard I have ever known. It has been kept well tilled, and fertilized with super-phosphates.

If a tree blights I advise, at once, to cut out every trace of it, and several inches of sound wood beyond the blight. *A blighted twig, even*, should never stay on a pear tree twenty-four hours. Have it cut off, carried away and burned. Keep one man in your orchard all the time, if necessary, in hot weather, to cut out blight, *carry it out of the orchard and burn it* forthwith. After you have cut out the blighted wood, slit down the bark from the cut (if on a limb) to the main trunk, and then

slit the bark of the main trunk on two opposite sides from the crotch to the ground, and well down the roots. Then dig out the soil from around the tree, one foot deep, and one or two feet from the tree on all sides, and sprinkle it well with the carbolic acid tree-wash, and fill up the hole with new soil taken from without the orchard, apply the carbolic acid tree-wash to the body, and, as far as possible, to all the limbs of the tree. Give the trees a good dressing, (especially if the wood and fruit-buds appear to indicate it by the rules laid down under the chapter on fertilizing the orchard) of a fertilizer suitable to the case.

CARBOLIC ACID FRUIT-TREE WASH.

For five hundred trees—take

Crude Carbolic Acid, one pint ;

Strong Whale oil soap, or soft soap, one gallon.

Mix this with two gallons of boiling water, let it stand twenty-four hours, and add seven gallons of rain water. R. Peters added soil to thicken it, and the wash, before noticed as his wash, may be used instead of this. If applied in May and June it will destroy the eggs and drive off all kinds of moths.

I say, don't use green manures if you don't want blight. If they are to be used, they should be thoroughly composted for a long time until all fermentation has

ceased. As to barn-yard manure itself, it don't contain phosphoric acid enough to balance the amount of nitrogen it contains, and a dressing of bone or acid phosphate after it will always increase any crop, and keep up the general condition of the farm. In general farming I advocate, as a rule, the application of all green manures to the corn crop, and with it a small dressing of a good chemical fertilizer, rich in phosphoric acid ; any good acid phosphate will do. Corn is a hog, and will take up and utilize plant-food in any shape. As to potatoes I advocate raising them with chemical fertilizers, rich in phosphoric acid, potash and ammonia. The potato rot, I believe, is caused by raising them with green manures, and these, fermenting, give every inducement to the increase of bacteria, and these cause the decay ; of course, other influences, as atmospheric influences, etc., come in to help increase the bacteria ; but keep fermentation down and these other influences won't be sufficient, in themselves, to cause such troubles as potato rot. For pears needing fertilizing after having been affected with blight, you may use any of the formulæ I have given for peaches or pears in the quantity necessary, or you may use kainit, six hundred pounds to the acre, or from five to twenty pounds to each tree, or such a formula as follows :—

Muriate Potash, 500 lbs.
Bone meal, or dissolved bone, 1500 lbs.

200 lbs. to 400 lbs. per acre, or from 5 to 20 lbs. to each tree.

Never crop your orchard when blighting. You may throw a standard orchard into sod and top dress the land, and sometimes check blight ; or sow to clover as before recommended, and plough under, the next June a year, and watch the result. My objection to lime here is, that, as a top dressing, it, in the absence of potash, is taken up too freely by the trees for their own good, and in sod can't act rapidly enough to liberate the potash naturally in the sand and stones of the soil.

A Dwarf orchard needs the very highest culture, and should scarcely ever be thrown into sod. The most I would do, would be to seed to clover in the spring, and then plough under, the next June a year, and watch it. Remember, in pruning diseased fruit trees, always to observe the rule I gave when speaking of pruning diseased peach trees ; apply to your knife or saw, one of the germicides there given, before leaving one tree to go to another. Indeed, in pear blight, you ought to thoroughly disinfect your instrument, not only between trees, but even in going from one limb to another, so contagious is this disease. One word more, and I close this subject. A grower has in his yard a favorite pear tree ; this tree grows in sod, continuously, and bears him abundant crops of luscious fruit, and receives no care or cultivation, whatever, and never shows signs of blight in

any way. The trees in his orchard, receiving every care of cultivation and fertilizing, sadden his heart in yielding to the destructive influences of that disease, and so he argues that they are receiving the wrong treatment, and he will leave them to nature, as he does the tree in his yard, and they will, necessarily, thrive as it does. He is wrong, he is reasoning from false premises. Isolated pear trees, as a rule, never blight, they only blight when crowded in orchard culture. Here the bacteria increase and multiply to the point where they become a disease, just as they do under the same circumstances with mankind, and this is the reason his favorite tree in the yard flourishes, while his orchard-trees wither and die.

THE SLUG.

Next to blight, the slug is, probably, the most serious enemy of the pear on the peninsula, now active. Here we call it the slug worm, from its snail-like, slimy character. In England they call it the slimy grub of the pear tree. Scientists generally speak of it as Harris does, as the *Selandria* (*Blenno Campa*) *Cerasi*. Blenno Campa signifies slimy caterpillar. It is a species of saw fly, and the above name is the name of the fly. Another name is, or rather a name for the slug is, *Erio campa adumbrata*.

According to Harris, the slug fly is of a glossy black color, except the first two pairs of legs, which are dirty

yellow, with dark colored thighs, and the hind legs which are dull black with clay colored knees. The wings are convex and rumpled on the upper side, like the wings on saw flies, generally. They are transparent, reflecting prismatic colors, and have a smoky tinge, forming a broad band across the middle of the first pair; the veins are brownish. The body of the female is over one-fifth of an inch long. The male is smaller. These flies appear on the Peninsula in the first very warm weather of May or June. They soon begin to lay their eggs, and in three weeks, have disappeared. Their eggs are placed singly, within small semi-circular incisions through the skin of the leaf, and generally on the lower side of the leaf. These flies are not easily alarmed whilst thus eagaged in laying their eggs. In fourteen days these eggs begin to hatch, and the young slug-worms continue to come forth, from the last of May until about the tenth of July, being influenced in time, somewhat, by the season. If the season is early, the flies deposit their eggs early, and if late, they are late in laying their eggs, hence, the slug worms are late in coming.

At first the slugs are white, but a slimy matter soon oozes out of their skin and covers their backs with an olive-colored, sticky substanee. The slugs have twenty very short legs, a pair under each segment of the body, except the fourth and the last. They are about

nine-twentieths of an inch long, when fully grown. The head is small and of a dark chestnut color, and is concealed under the fore part of the body. They are largest before, and taper behind, and resemble small tadpoles. They swell out the fore part of the body and, rest with the tail a little turned up. They live mostly on the upper side of the pear leaves, and eat the substance, leaving only the veins and the under skin untouched. They may be so numerous as to cover the leaves. The trees thus attacked are forced to throw out new leaves during the hot weather, at the ends of the twigs and branches that still remain alive, and thus use leaf buds that should not have come out until the next spring. Thus the vigor of the trees is exhausted, and as the leaves elaborate the juices of the fruit, the fruit itself must suffer. In twenty-six days these slugs come to their growth and, in this time, cast their skin five times. They eat the first four coats, but never the last, and after they have gone, you see this last skin stretched on the leaf. After this last coat has been shed, the slugs are not slimy, but have a clean yellow skin, and not viscid.

They change also in form, become longer, and you can see the head and the marks between the rings. Now in a few hours they leave the trees, having crept or fallen to the ground, and a high wind at this time with dry atmosphere, favors them. Now, on the ground they

burrow from one inch to three or four inches, as the soil is soft or hard. They wriggle in their holes until they form a space for themselves their own shape ; now they line it with a sticky, glossy substance to which the grains of earth adhere. Now this becomes their cocoon and in them they change to chrysalids. In sixteen days this is finished, and they break their cells and crawl to the surface where they appear as the winged fly, the point from which we started. This second crop of flies for the season comes on the Peninsula about the middle of July to August first, and lay their eggs for a second brood of slugs. These latter are again seen on the trees, and dont reach their growth until September, when they go into the ground as the first brood of slugs did. This September brood remains in the ground all winter, and they come out flies the next May, and so the wheel revolves. Some may remain in the ground until the second season before they come out as flies.

The remedies for the slug are various. White hellebore, one pound to thirty gallons of water, and throw it on the leaves by a fountain syringe, or through the rose on the watering pot. White hellebore as sold is often inert and useless ; snuff it a little and if it makes you sneeze, it is good, if not, it will be of no use. Green hellebore (our common polk root) will do as well and can be gathered and dried for the purpose. Dust them with any dust (road dust, plaster, lime, ashes, etc., will

kill them) and is best applied in the mornings when the leaf is damp. Paris green and London Purple, one tablespoonful to five gallons of water, will destroy them quickly. So arsenic, in same proportions and is cheaper. These of right should be boiled to dissolve them as much as possible, and agitate constantly whilst applying. These last poisons are perfectly safe for the first crop of slugs, but don't use them on the second crop, when fruit is maturing; they might prove very dangerous to those eating the fruit. Hellebore may be used at any time. Mice, rabbits and moles destroy many in their cocoons and birds destroy many as slugs and flies. They also have an enemy of their own, a small fly which lays its egg in the slug fly's egg; from this egg a maggot is hatched, and it devours the slug-fly egg, forms its cocoon in it, changes to a chrysalis and hence, to a fly again. The secret of getting rid of the slug is to watch it and get ahead of it; hence, it is important to know all about it, and its habits; watch carefully the first hot spell in May and you will soon see the little flies. They now begin to lay their eggs, and now is the time to hellebore them or Paris green them, for it will be absorbed by the eggs and destroy them. Now in two weeks remember the eggs hatch, and now apply your remedies and don't let them get ahead *one* day or they will get ahead of you entirely. In the same way watch for the second crop, which we have told all about.

ORCHARD CATERPILLARS

of different kinds, true and false, bother pear trees a great deal, although I can't say they do great harm, as a rule, yet they make large nests and eat more or less of the leaves. Winter is the time to destroy these in their rings of eggs on the shoots. Clip them off and burn them, or burn them off with a torch on a long handle. They are nearly an inch long and half an inch in diameter.

THE APHIS.

Bark lice have been described when writing of peaches, to which the reader is referred. Destroy them by one of the tree washes given, or by Sulphide of Calcium, one pound to five gallons of water.

SCALE.

These insects have also been described and treated of, under peaches. For their destruction use the tree-wash according to the directions. A wash of gas-lime and water will contain Calcium Sulphide, and makes a very useful wash for trees subject to any pests.

CURCULIO.

Curculio has been described when treating of the peach. It certainly injures pears more or less on the peninsula, and every means in the power of the grower should be used to destroy it. Use the same remedies as

given for it on peach trees ; also on Pears. Paris Green them early in the season.

APPLE WORM.

Codling moth : a true caterpillar ; and in due time changes to a moth, called *Carpo Capsa Pomonella*, and is very beautiful, with brown, copper and gray colors, with satin yellow. This moth does injury to pears, sure ; but is not a pest as yet as it is in apple orchards. The eggs are laid in the fruit, and the worm, hatching, burrows in towards the core, and the apple drops, as a rule, and the worm comes out of it, gets into a sheltered place in the bark of the tree and spins a white cocoon, then turns to a chrysalid, and then comes the moth again. This is Harris's description. Paris Green these pests, or use hellebore, etc. The grower who watches all these destroyers the closest, and makes way with them, will have the best fruit and most of it. I don't think the peninsula grower yet realizes what destructive agents all these creatures are, and they are increasing. After a while some great natural destroyer comes along and decimates them, just as happens to all life on the globe, from the highest to the lowest ; for how else could life on the earth survive ?

THE PEAR TREE OYSTER SCALE.

Diaspis ostreæ-formis,(Curtis.) From U. S. Gov. Agricultural Report, 1880.) The scale of the female is circular

or broadly oval, and dark, ashy gray color, and sometimes nearly white. The exuviæ are dark brown. The body of the female is rounded, cordate when young. The anterior group of spinnerets consist of eight to twelve ; anterior laterals of twelve to thirteen ; posterior laterals of eight to fourteen. Median lobes, large and connate about half their length. Each lobe is rounded at its dorsal extremity, and widened anteriorly, sometimes abruptly. On each side of the median lobes are three slight incisions in the margin of the body ; the margins of these incisions are thickened ; there is a fifth rudimentary lobe, usually between the fifth and sixth plates. All plates except the first pair are well developed. There are three or four plates on the penultimate segment, and on the ante-penultimate, one or two. The spines are a short one near the meson, on the first lobe, and a long one, lateral, on the same lobe ; third and fourth caudal, of first and second incisions ; fifth, lateral of third incision, and the sixth, between the sixth and seventh plates. On ventral surface the spines are smaller, and the first and second are obsolete ; and the third and fourth on side of the second and third incisions, and the fifth between the fourth and fifth plates.

The scales of the male are of an elongated, oval form, and much flattened, especially posteriorly. The middles are feebly keel-shaped and the sides are not keel-shaped. The larval skin is light brown and is about

one-third the length of the whole scale. The ventral side is closed, leaving only a narrow transverse slit at the posterior end. Color of scale, white ; length, 2-3 of an inch. The color of the male is bright ochre, with eyes and throat-band black. This scale is common in England and I give it here in order that our growers, especially our intelligent young growers, intent after knowledge, may look for it, and looking for it, I know they will find it. Every fruit grower should be a naturalist, even if in a small way. Any of the tree washes given will destroy them. Especially carbolic acid washes, and the wash of one pound of copperas to one gallon water.

THE ELEMENTS.

Heat we have spoken of as often injuring the pear prospect, so thunder storms, cold rains, especially easterly rain-storms, coming on and lasting several days at the latter end of blossoming time, often decimate the crop. Wind storms and rain storms at picking time are also destructive, but against such visitations of God, poor, weak man is powerless.

STARVATION.

Many trees suffer from starvation, and starved trees are, of course, subject to all the train of evils coming on weak trees. The remedy, of course, is proper nourishment.

OVERFEEDING.

Trees may be injured by overfeeding as well as by starvation, and it becomes the liberal grower to watch closely the effect of his freely applied fertilizers.

CRACKING OF THE FRUIT.

This comes from a fungus on the fruit and the best remedy is salt to the trees, with good culture generally. Dry weather and heat may also crack some varieties.

DECAYING OF THE FRUIT.

The decaying of fruit from fruit parasites has been spoken of. The natural decay, as here alluded to, must be combatted by proper culture, and prompt and proper attention to the fruit before and after it has been picked.

THE PEAR TREE BORER.—*Ægeria Pyri.*

It is thus described by Harris:

Its wings expand rather more than half an inch, are transparent, but veined, bordered, and fringed with purplish black, and across the tips of the fore wings is a broad, dark band, glossed with coppery tints; the prevailing color of the upper side of the body is purple black; but most of the under side is golden yellow, as are the edges of the collar, of the shoulder covers, and of the fan-shaped brush on the tail, and there is a broad, yellow band across the middle of the abdomen, preceded by two narrow bands of the same color.

An infested tree is known by the castings thrown out of the small perforations made by the borers, which live under the bark of the trunk, and subsist chiefly upon the inner bark. They make their cocoons under the bark, and change to chrysalids in the latter part of the summer. The winged insect appears in the autumn, having, like others of this kind, left their chrysalis skins projecting from the orifice of the holes which they had previously made. In its winged form it is like the Ægeria, which inhabits the currant bush, but is smaller. The remedy is to hunt them in their holes, known by the castings around it, and poke them with wires, and apply one of the tree washes. One of the carbolic acid washes is the best.

This borer inhabits both the Standard and Dwarf pear woods.

THE QUINCE TREE BORER—"*Saperda Bivittata.*"

This is the borer that plays havoc with the Dwarf pear trees, attacking the quince stock. Downing describes it as the larva of a brown and white striped beetle, half an inch long, and it remains in this grub-state two or three years, coming out of the tree in a butterfly form, the last of May or the first of June, and flies in the night, only, from tree to tree, after its food, and finally depositing its eggs during this and the next month in the collar of the tree. Here the grub either girdles the quince

stock or perforates it in every part, and, if not destroyed, finally causes the death of the tree. Pick it out with a knife, or poke it to death with a wire. Pile ashes around the trunk and it can't reach the quince to deposit its eggs. Trees planted below the pear and quince junction won't suffer from these borers. Build small fires about the orchard in June nights, and thousands of these and other beetles will be destroyed. These fires are to be recommended in all Peninsula fruit orchards, in the warm nights of May and June, yearly.

The *Areoda Lanigera*, Goldsmith beetle, sometimes eats the tender leaves of pear trees. Harris describes it as nine-tenths of an inch long, broad, oval in shape, of lemon yellow color above, gold head and breast, under side of body copper colored, and covered with whitish wool. Its legs are yellow and green. Its larvae are unknown. Destroy them by night-fires in the orchard.

The seventeen year locusts—*Cicada Septendecim*—may destroy Pear trees. The larvæ, in countless numbers, are sometimes found at the roots of declining trees, with their suckers piercing the bark. Dig them out and apply a carbolic acid tree-wash in the hole.

Another enemy to the pear is described by Harris as the Pear Tree Psylla—Psylla Pyri—Harris' description is taken from Köllar's Treatise. The Psylla comes from its winter retreat provided with wings, as soon as

the buds of fruit trees begin to expand in the spring. After pairing, the female lays her eggs, in great numbers, near each other, on the young leaves and blossoms, or on the newly formed fruit and shoots. The eggs are oblong, yellowish, and look something like grains of pollen. The young insects hatched therefrom resemble wingless plant-lice, and are of a dark yellow color. They change their skins and color repeatedly, and acquire wing-scales, or rudimentary wings. They then fix themselves to the bark in rows, and remain sucking the sap till their last change approaches, at which time they disperse among the leaves, cast off their skins and appear in the winged form. When considerable numbers attack a Pear tree, it soon assumes an unhealthy appearance, its growth is checked, its leaves and shoots curl up, and the tree dies by degrees, if not freed from its troublesome guests.

To destroy the Pear Psylla, Köller recommends brushing them off, etc., which would be too slow for the large Peninsula orchards. For its destruction, I would recommend the application of the following wash which I have received from Washington through the courtesy of the Superintendent of the grounds attached to the Agricultural Department ; Mr. Wm. Saunders.

This wash has been used in the grounds with great success in the blight of Pear trees, being applied as a paint as often as necessary when the bark is injured, or apparently

dying, removing the old bark to the sap-wood first. Mr. Saunders thinks sulphur is the most useful ingredient, not attaching much importance to the Carbolic Acid.

THE SAUNDERS AGRICULTURAL GROUNDS PEAR TREE WASH.

Crude Carbolic Acid, one quart.
Powdered Sulphur, ten pounds.
Stone Lime, one-half bushel.
Hot Water, sufficient to make whitewash.

Put the sulphur and lime together in a barrel and pour on hot water until the lime has been slaked. This wash should be applied to the body and limbs of the trees *before the buds expand in the spring*, and it then will not injure them. Of course it is not to be used unless we have found evidence of the presence of the psylla, in the spring, or the year before.

These remarks concerning these insects may be dry reading to some, but I warn peninsula fruit growers to heed them, for they are increasing annually in numbers and kind, and in the future, he who fights them most successfully will be the most amply rewarded.

Don't forget to build fires in all your fruit orchards each season, occasionally during the hot nights in May, and each of the summer months, Thousands of moths will fly into these fires and be destroyed.

SHEDDING OF FOLIAGE.

It appears to be inherent in some pear trees to shed their foliage prematurely, independent of any pest or disease. The Belle Lucrative does this on the Peninsula, and so, to some extent, the winter Nelis and Duchess. If it seriously affects the trees, I advise root-pruning in the autumn. Expose the roots three or four feet from the tree and cut them off with a clean cut. Pour in some soap suds, and cover up the roots and the operation is finished.

FROST.

At times, cold is a serious enemy to the pear. The wood is stronger, and less delicate than peach wood, and probably no degree of cold we have on the peninsula ever kills the wood or even the fruit buds. But the tree entering the winter with a second autumn growth of succulent wood, may have this wood so affected by low temperature, as to render it liable to the ravages of blight, when the warm weather comes—as has been explained under that disease. It is in the spring that the pear suffers most from frost, just when the blossom is perfected, and on to the time when it is leaving the embryo fruit. I think the Duchess Pear is particularly a little tender at this time. Again, at this stage, an easterly storm with cold rain is very apt to cause great loss to the pear grower, and, indeed, I look upon the

coming of such a storm, at such a time, in the light of as great a disaster as can come upon the approaching pear crop. Late frosts may cut the foliage, somewhat, of trees, but this is not serious, and is soon repaired. A smudge burned on frosty nights, in small orchards, where the thermometer goes to 44°, or lower, may raise the temperature two or three degrees, and is worthy of trial.

CRACKING OF THE BARK.

The bark of pear trees may be cracked by frost, disease or accident. If seriously cracked, clean well and apply the Saunders Agricultural Grounds Wash. If a tree is injured and much bark is skinned off and lost, apply clay mortar with some of this wash mixed in it to render it antiseptic, then wind a piece of cotton duck around the part affected, and tie it on with woolen yarn. The yarn will expand with the growth of the tree and in a year or two, on removing the dressing, the wound will be found to have healed. Any kind of injured tree may be saved by such a process. Before leaving this subject of diseases, and enemies of the pear, let me impress upon growers the necessity of protecting the insectivorous birds frequenting their orchards, and I even crave this protection for the much abused sparrow, unless he becomes much more numerous than he is at present. Frown down all wanton destruction of insect-eating birds, and enforce by precept and example, all

laws formed for their protection, and you will preserve and enlist in your cause a worthy ally in your struggle with the insect pest.

Chapter XVI.

PICKING PEARS.

As a prelude to picking the matured fruit, comes in hand-thinning of the undeveloped fruit, in order to give that allowed to remain on the tree, a better opportunity for development. Among amateur growers and in garden culture, and small orchard culture, this is a practicable operation, and is to be recommended, if one wishes to get fine specimens of large fruit. In the large orchards of the Peninsula where the pear is grown for market profit, this hand-thinning is not much practised on account of the great labor it requires. In a measure I advocate it, especially in Dwarf culture, and especially in productive kinds like the Buffum, or Barlett, or Howell. When we find a limb over-crowded, pick off a few of the poor ones and you will get finer and larger pears from those that remain.

It has been given as a rule in hand-thinning fruit, to take off all you think should come off, and then take off half of those which remain. This is a good rule for the professional or amateur raising specimens for the Agri-

cultural Fair, and it is in this way premiums are taken. Such hand-thinning would be neither practicable nor profitable in large field orchards, and for them is not to be recommended.

PICKING THE CROP.

Most pears when ripened off the trees, color up better, have a finer perfume, and are of much richer flavor than when ripened on the trees. Yet many will ripen well on or off the trees, as the Bartlett, but the Clapps Favorite, for instance, will be disappointing if permitted to remain on the tree until mellow. It must be gathered at just the right time, kept in the right place, and eaten at the right time, or it will rot at the core and be worthless. These points will serve to show how much judgment and experience must be exercised in gathering the pear crop. The early varieties, as the Summer Doyenné and Bartlett, and Manning's Elizabeth, must be gathered early, in order to get them into market and anticipate the northern growers, and the peach competition. A Bartlett pear, two-thirds grown, will ripen off the tree with good flavor, and usually can be gotten to market before peaches come, but there are exceptional years, when the season is late, and they come in with Peninsula peaches, much to the disadvantage of the pear. The season of 1885 was thus an unprofitable season to the growers of Bartletts, the fruit coming in with early peaches. Later pears must not be gathered too soon or

they will fail to ripen with high flavor, yet at the same time they must not be allowed to ripen on the trees or they will lose color and flavor. Winter fruit may be left on the trees quite late, but must be watched closely and not allowed to drop of its own accord. It is important, as soon as gathered, to have it culled and packed in its proper packages and stored in its proper storehouse, dark, and with equable temperature, or it will decay without ripening. It certainly makes a great difference in pears when they be gathered, and how they be kept and ripened to give them their true color, aroma and flavor; give me a fine pear and I think I can tell you how it has been handled after picking.

A pear is ready to be gathered when, as a rule, the seeds are brown in color, and it separates readily from the stem on being lifted up at an angle of thirty degrees above its horizontal. In picking, see that your men are careful not to disturb the fruit spurs of the tree, or next year's crop may be much diminished. This is very important to attend to. If a limb breaks partly off, before the pears are ripe, allow it to remain until it matures the fruit on it, then cut it off, as you should do all such limbs, after picking is over.

Pick all pears, where possible, with their stems on. Such fruit is, in every way, more desirable and saleable. As a rule, go over a pear tree three times, at each picking

removing such as are fit to come off. On an average, it will require about ten days interval between the first and last picking; of course all pears must be hand-picked and handled like eggs, and gently placed in baskets, and quietly removed to the culling house, where they are to go through this process at once. Good fruit that is thoroughly culled and well packed, will invariably pay a handsome profit.

Pick pears on cool, dry days, if possible, and, with the average pear, picking a little early improves the keeping quality, aud holding it a little later, will help the aroma and flavor.

CULLING THE FRUIT.

Pears must be culled by hand, and very carefully. Grade them by the Fruit Exchange Standards, if they have any. Heretofore, my divisions have been into extras, primes, culls and windfalls. Sometimes I may ship a few double extras in small crates with a handle, each pear wrapped in tissue paper. This is a wrinkle in pear shipping that often pays the grower, and gladdens the hearts of the buyers too. Cull the windfalls, ship the best at once, in crates, and sell the culls to the evaporators, or evaporate them yourself. Having culled the fruit, commence now by shipping all that is fit to go, having put it in its proper package. As the culls are ready, sell them to an evaporator, or evaporate them

yourself, and make the refuse into cider and hog-feed. Now you have, say, double extras, extras and primes, for market shipment. Put them in baskets and set them away in the dark, dry room of your detention house. For double extras and extras, you should have drawers holding one bushel, more or less, and these drawers in closets with doors. Assort all pears daily, or, every other day, as they are ripening rapidly or slowly. The moment you detect the least sign of fitness, viz., rapid coloring and slight softening, ship them at once and put the remainder back for further inspection. This detention house may be a granary, second story, or a building for the purpose. The second story is best for pears. All such houses should have an open box with lime gently air-slaking all the time. This robs the air of much moisture, and the dryer your detention room the better.

COLD STORAGE OF PEARS.

By cold storage, pears may be kept long past their proper season, and put on the market when the glut of the variety is passed. The house is built by different patented processes, and ice is used to keep the temperature down to 38° Fahrenheit, the point it should be kept at; cold storage of peaches has been tried, but has not paid the cost; cold storage of pears has been carried on successfully for several years, as far as keeping them well preserved is concerned. Individually, I think the

flavor is injured and the refrigerated pear is not a gastronomic success. In November, I don't want a Bartlett ; it is a hot weather pear. In that month give me a Lawrence, and it keeps without cold storage. The pears are packed in the cold-house by rule, and if care is not taken, the top layer will decay ; the hot air ascending. As soon as removed from the refrigerator the pear must be shipped and sold. They don't stand up well. As a rule, the boxes, to make sure, after having been taken from the refrigerator, must be opened and culled over. There is more or less average loss from decay.

MARKETING THE CROP.

Double extra pears should be packed in one-third crates with a handle of rope or leather at one end, and each pear wrapped in tissue paper. The extra care will well pay the grower. Market extras in the regulation peach baskets with covers, as the best package now obtainable. We want a new package for extra and double-extra pears made something like a grape basket with a handle. Any display of taste and refinement here, will come back with large returns. The new fruit package, the ripe fruit carrier, I have hopes of, although I have not yet examined it. It will hold about one hundred large peaches or pears, each wrapped in tissue paper and packed in its own individual apartment. I think this is the package Mr. Cochran made his successful shipment of peaches to Europe in, last year, and it doubtless will carry ripe pears equally well.

Ship primes in the regulation fruit crate of the Peninsula. Pears in transit must be kept out of the reach of thieves and vandals, and for this reason the crate is better than the open basket for the inferior qualities. Sell through the Delaware Fruit Exchange, if possible. Next, sell at your fruit house, or at your Rail Road Station. If unable to do either of these things, ship to the best market you can hear of. Never ship a car load or large quantities at once. The market is sensitive as to pears, and a car load coming at once from the Peninsula, especially, to even a large city, will dull its edge. Ship, say, from twenty-five to fifty baskets or crates every two or three days. I am speaking now of late pears. When we are shipping early pears, we must watch the market, and, by all means, get them in early, before Peninsula peaches and northern pears.

EVAPORATING THE PEAR.

The process of evaporating is the same for all fruits, and for its description I refer the reader to the proper heading in the part of this book, devoted to the peach.

The market for evaporated pears has, as yet, to be made, but they form such a delicious and wholesome article of diet, that there can be no doubt of their speedy popularity, when thrown on the market in large quantities. The Bartlett is, doubtless, the best of all pears to evaporate. The Howell, the Duchess, (when

ripe,) the d'Anjou, the Lawrence, the Louise bonne de Jersey, and any good soft pear will make good evaporated fruit. The pears must be pared, and then sliced longitudinally or across into about four to six slices, and placed upon the evaporator trays. As to the time it takes, and the amount of fuel required for pears, in comparison with peaches, authorities differ. Apples are easier to evaporate than peaches, and a Bartlett pear, it appears to me, should be about between the two ; a little more difficult to evaporate than the apple, and a little easier than the peach. The Bartlett pear ought to evaporate in from twelve to eighteen hours, depending on the strength of the fire. Don't evaporate pears too rapidly, or the edges will blacken and curl up.

CANNING PEARS.

The process of canning has been described in its proper place under the peach, and it is not necessary to again refer to it here. In canning fruit, we merely destroy the bacteria by heat, and then hermetically sealing it, we prevent their proliferation, and so long as it remains air-tight, it must remain absolutely unchanged and unchangeable. The Bartlett is the most desirable pear for canning purposes, and the Howell makes the whitest and most beautiful fruit, and must always be a favorite among those following the business. The Duchess and Lawrence and d'Anjou, all make lovely fruit when hermetically sealed, and must be sought for wherever the business is carried on.

CONSERVES.

As with peaches; half preserve pears, and pack them down in white pulverized sugar, and we get a delicious conserve that will, with proper care, keep for an indefinite time. The French excel in such dainties, but there is no reason the business should not thrive on our own peninsula, and some of our people given to such work should engage in their extensive manufacture. There is no doubt of a market for as many as can be produced.

WORK FOR EACH MONTH OF THE YEAR IN THE FRUIT ORCHARD.

I am indebted to Thomas for many points here given.

JANUARY.

Tread the snow about young trees to drive away mice. Rub the trees with raw liver if rabbits become troublesome. Drain off all water accumulating about trees. You may prune hardy trees, covering the wounds with copal varnish, or paint, or wax ; cut grafts and pack them away in a celler in damp sand or saw dust. Don't let stock of any kind get into the orchard.

If you want trees for spring planting, look around for them, and determine what you are going to plant. Let nurserymen prepare for spring, getting packing materials, etc. Nurserymen may now graft seedling

pears for standards, and, when finished, pack them away in moist sand or saw dust until spring planting-time ; do mulching that has not been done earlier. Think over and mature your spring plans.

FEBRUARY.

Do now anything you should have done in January, as everything is still dormant. Examine all trees for caterpillar nests, and cut them all off and burn them, and rub off all suspicious spots on the branches of the trees. You may top-dress orchards now if you don't intend to break them up in the spring. Use the rules directed for fertilizing. Make labels, stakes, ladders, crates, boxes, etc.

MARCH.

Use tree washes. Finish all February work incompleted. Sow clover in your orchard if you propose to do it this spring. Graft the apple, the cherry, the pear. Shorten back trees, now or early in April. Cut back your young trees planted the previous autumn, and prune them ready for their first year's orchard growth. Plough fruit orchards if ground is fit.

APRIL.

Use tree washes. Plant all trees, and get at it by the tenth of the month sure, if possible. Set out all cuttings. Plant all fruit tree seeds, if they are to be transplanted

from sprouting beds of last fall. Take those first which show evidence of sprouting. Peach stones start later than the stones of other fruits, and it is well to remember this point. Harrow and cultivate fruit orchards after ploughing. Spade in winter mulching, or better, fork it in, and level any mice hills erected around trees the previous autumn. Never cut the shoots of a young tree back after the buds have swelled in the spring. Stake up crooked trees. Kill all orchard caterpillars found.

MAY.

Use tree washes. Rub off all buds coming below the new bud on budded trees. Give quince, and other trees needing it, their hot weather mulching. May hand thin some fruit. Kill all orchard caterpillars found, commence to destroy curculio, and examine for pear tree borers and apple tree borers and quince borers, and watch well from this time out, dwarf pear trees, when not planted below the quince junction. Continue cultivation of orchards. Look out for pear-slug on the Peninsula and destroy it by some of the means given.

JUNE.

Use tree washes. Build fires in orchards hot nights. Do all things neglected or unfinished from May. Watch pear-slug, curculio and all such pests. Destroy aphides. Rub off supernumerary shoots on young fruit trees. Look well for the evidences of peach and pear borers.

Hand-thin fruit. Look well to evidences of pear-blight coming. Mulch cherry, quince and chestnut trees, etc. Bud peach trees and other trees, if desirable.

JULY.

Use tree washes. Build fires in orchards hot nights. Stop orchard cultivation on the Peninsula, as a rule. Mulch all young trees that cannot be cultivated. Hand-thin fruit and rub off supernumerary shoots on young trees. Bud all trees at any time now. Look out for second crop of pear slug, and watch all borers. Watch for pear and quince blight, etc., and cut it away and burn it. Gather early apples, pears, and peaches and other early fruits.

AUGUST.

Summer prune trees. Pinch off supernumerary shoots. Mulch trees suffering from hot weather. Watch for insects, grubs, etc., and destroy them. Build moth fires in orchards hot nights. Cut out pear blight and use the tree washes. Continue budding. Watch budded trees and cut off ties, etc. Continue gathering fruit.

SEPTEMBER.

Summer prune trees. Continue gathering fruit and budding trees, and cutting off ties, etc. You may plough ground for setting out new orchards in November. Commence to house pears for ripening, and apples, too. You may top dress orchards.

OCTOBER.

Attend to your housed fruit and the shipping of it. Plant peach pits. Continue gathering fruit and housing pears and apples, etc. You may top dress orchards. Prepare ground for young orchards.

NOVEMBER.

Plant your young orchards, and don't begin later than the end of the first week. Heel in all stock you can't plant. Make cuttings for quinces, etc., and put them away in moist moss, or heel them in the ground. Attend to your housed fruit and the shipping of it.

DECEMBER.

Complete all November work. Cut grafts and put them away. Winter-mulch trees. Put away all tools, etc. Attend to housed fruit and the shipping of it.

Read over January directions.

Chapter XVII.

In order to test the opinions of pear growers, I sent out the following questions, and received the following series of answers, which will be found very interesting, and very useful, to those engaged in the business of growing this luscious fruit. As each question will be numbered, and each answer numbered to correspond to the question, no trouble will be found in reading them understandingly.

Question 1. Give the best list for profit of an orchard of one thousand pear trees for the Delaware and Chesapeake Peninsula.

Question 2. Do you prefer Standards or Dwarfs, and please give your reasons for the preference?

Question 3. What is the best soil for pear trees, also best situation as to shelter, hill, valley, etc.?

Question 4. What is the average life of a Peninsula Standard Pear orchard, and what is the average life of a Dwarf orchard?

Question 5. When, in your opinion, is the pear

crop most frequently injured by frost? Fall, Winter or Spring?

Question 6. Does very low temperature in Winter kill the pear buds? If so, how low?

Question 7. Do you plough early, or late, in the Spring? How deep, how often, and what is your method of cultivating after one ploughing?

Question 8. What fertilizers do you use, and when, and in what quantity, and how do you apply them?

Question 9, When and how do you prune the trees. and do you ever hand-thin the fruit? If so, with what result?

Question 10. What, in your opinion, causes pear blight, and how do you treat it?

Question 11. Do you worm your pear trees? If so, when and how?

Question 12. Do you have slug? If so, does it permanently injure the trees? What remedies do you use for it?

Question 13. Does Curculio injure Peninsula pears?

Question 14. Do you see any new enemies, lately, injuring the Pear tree or fruit?

Question 15. What is your idea of cold storage for pears? Does it pay, and what effect has it on the flavor of the fruit?

Question 16. Give your idea of the best way to gather, hold, and market the fruit, and the best packages in which to ship it.

Question 17. Which is the best pear to evaporate? The second best, the third best and the fourth best? Do pears or peaches evaporate the easiest?

Question 18. Has pear-growing been profitable with you?

ANSWERS RECEIVED FROM GROWER, NO. 1.

Question 1. LeConte Standard, Kieffer Standard, Bartlett Standard, Clapp's Favorite Standard, Louise bonne de Jersey Standard, Washington Standard, Beurré Diel Standard; those are Standard; will put the Dwarfs on the other page.

Question 2. Dwarfs, I prefer, as they are always sure to bear, and will not occupy as much land as the Standard.

Question 3. Stiff loam; never plant in sandy land, or in gravel, or on side of a hill. Take flat land.

Question 4. Thirty years for Standard, twenty for Dwarfs, and twenty-five to thirty for Dwarf if you cut the bark above the union as you plant them, so as to make them throw out hair-roots.

Question 5. Spring.

Question 6. I have had them to stand 5° below zero, cannot stand it long; never had them killed in the winter; I have had them injured some.

Question 7. Plough as early in Spring as the land will permit, from 3 to 4 inches. Plough twice a year till the orchard is 4 years old, and plant in Dwarf, corn, and cultivate three times; five years old, plough once, and harrow and cultivate once; six years old, plough once, and harrow, and let it go.

Question 8. Kainit, 300 lbs. broadcast, after fruit comes off, and plough down in Spring.

Question 9. In fall, as soon as leaf falls; cut back one-half every year. Hand-thin fruit sometimes; it does not pay. Cut back one-half until the orchard is five or six years old, or according to the growth.

Question 10. Excess of growth will cause sap-blight, or putting manure on your orchard. Cut it three inches below the blight, and burn the blighted wood. Do not let it lay in your orchard. Body-blight is more serious.

Question 11. Late in fall, with knife and hoes. It is seldom ever regarded, only in light land. In heavy land you never will have any worms.

Question 12. Sometimes eats leaves of the trees and kills fruit. *Spread rotten potatoes under the trees,

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Bad advice. J. J. B.

or rotten apples ; the slug will eat of them and let the tree alone ; or when the dew is on the leaves, sow on them air slaked lime.

Question 13. Very much. They injure the fruit by stinging the pear. No remedy, only shaking the trees late in the evening, for about two weeks, when the fruit is young.

Question 14. None.

Question 15. It will pay if pains are taken in gathering the fruit ; flavor is better, if not picked too green.

Question 16. Pick one by one as they get ripe. Go over your trees twice a week, ship as soon as you gather, if you can get a fair price ; ship in crates ; if you hold them, keep them in a cold place, and very dark ; do not let the light in.

Question 17. No experience in drying pears.

Part of Question (1). Dwarf, Duchess, Stevens Genesee, Belle Lucrative, Beurré Bosc, Glout Morceau. More money in Duchess than any pear grown.

Question 18. Is pear-growing profitable with you ? I have certainly made money out of pears. In fourteen years I never failed to raise a crop. I have 2500 trees. Keep manure, such as barn-yard manure or stable manure, out of your pear orchard ; it will cause blight. Select

a heavy loam and flat land for your orchard, and for Dwarfs, plant six inches below the union ; cut the bark heavy above the union before planting ; do not mix your Standard with your Dwarf in planting ; plant your Dwarf full ten feet apart each way ; Standard, fully twenty feet. If you mix in planting, the Standard will smother out the Dwarf ; do not plant too many varieties.

ANSWERS RECEIVED FROM GROWER, NO. 2.

Question 1. I have not at command, nor have I the ability or time to answer in a satisfactory way.

Question 2. Standards have done best with me. The fact that my Dwarfs break off at the point where the quince and pear meet, when heavily loaded with fruit, or during high winds, is a serious objection. Some varieties seem to die young on quinces. Such is the case with Kieffer.

Question 3. An alluvial soil with open sub-soil, and elevation with western exposure. Valleys are an objection for all fruit trees that are liable to be killed by late frosts.

Question 4. Cannot tell, as my Standards and Dwarfs are all alive that I have planted since I am in the State, which is nineteen years, and show no signs of giving way.

Question 5. Spring, by late frost and eastern rain.

Question 6. I do not know that pears will kill, unless trees are killed by low temperature, nor do I know how low.

Question 7. First of May. Eight inches. All orchards should be ploughed that depth; once is sufficient, I harrow across the balance. I go over with duck bills and flukes; once a week is not too often, and as long as you can get under the tree.

Question 8. Bone and potash, either Fall or Spring. From four to six hundred pounds per acre. If I get my potash from Kainit, I throw from wagon with shovel, but if I use a more concentrated form, it must be spread broadcast, by hand, or with spreaders made for the purpose.

Question 9. Spring, just before they bloom. If trees are pruned just before they bloom, a careful pruner will cut out enough bearing wood so that the remaining fruit will mature.

Question 10. Too much lime and pound manure. Fertilizer described in No. 8, will check it.

Question 11. No.

Question 12. Yes; no; road dust, air slaked lime or plaster, either will answer to kill them.

Question 13. No.

Question 14. I have seen Kieffer pears, almost matured in New Jersey, punctured by an insect; it has not yet reached us to my knowledge. This is the first year it has been noticed, I am told. It must be new.

Question 15. In my opinion it is necessary in order to save them in the gluts. I have seen Bartletts sell for 30 cents in the gluts, and those kept in cold storage sold for $1.50 per basket in November. The effect is scarcely noticeable.

Question 16. Hand picking. Hold, in a retarding house all fruits that are not sold by auction at home. They should be stored in a cooling house, reported in the city and sold by order. The $\frac{5}{8}$ basket thus far is the best.

Question 17. The Bartlett has proved best for us. The next is a sugar pear, a native of Delaware. The difference, if any, is very slight. As I have said before, my experience is so limited on pears that I cannot say any thing to benefit you, and you will have to excuse me with this.

ANSWERS RECEIVED FROM GROWER, NO. 3.

Question 1. Bartletts all the time.

Question 2. Standards. Because there are only five varieties that succeed as Dwarfs, and they come in bearing but little sooner than Standards, and are very liable to break off where the pear and quince unite.

Question 3. Sandy loam, with clay and sand mixed, for sub-soil. Would plant on hill every time, as you are less liable to frost.

Question 4. I am unable to answer.

Question 5. In the spring at or about time of blossoming.

Question 6. I don't think they are scarcely ever killed in winter.

Question 7. I usually plough about June first and then cultivate enough to keep the soil loose and free from weeds.

Question 8. Kainit and bone meal, in as large quantities as I am able. Don't think that 1,500 lbs. of Bone Meal and 500 lbs. of Kainit per acre would work any injury.

Question 9. I pruned my trees severely the first two years, until I got them headed and started to suit. After that only enough to keep in good shape and open to the sun.

Question 10. It is undoubtedly a fungus, and my treatment is to watch closely during the warm season and remove all blight, promptly, from 12 to 18 inches below every sign of the disease.

Question 11. No answer.

Question 12. Yes. If not killed they will kill the trees. I use "London Purple."

Question 13. Yes, very much.

Question 14. The fruit was badly injured this year, from a fungus, causing it to be badly specked all over; especially Bartletts.

Question 15. Of my own knowledge I cannot answer.

Question 16. No answer.

Question 17. (1) Bartlett. (2) Beurré d'Anjou. Peaches evaporate much easier than pears.

ANSWERS RECEIVED FROM GROWER, NO. 4.

Question 1. Standard, 600 Bartlett, 300 Lawrence, 100 Kieffer. Dwarfs, 500 Bartlett, 500 Duchess.

Question 2. I prefer Dwarfs because they are larger and less liable to blight, except Lawrence and Kieffer, those as Standards.

Question 3. I would take loam or sandy soil and a northern slope.

Question 4. We have the Standard and the Dwarfs 14 years old, and they are doing well at this time.

Question 5. Spring.

Question 6. Do not think that will hurt them without killing the tree.

Question 7. Plough early in Spring; $2\frac{1}{2}$ in. is plenty deep. Cultivate, after one ploughing, up to the 10th or

15th of June, then stop, grass or no grass, weeds or no weeds.

Question 8. Feed the trees with the best phosphate you can get ; 400 lbs. per acre, in the spring, after ploughing.

Question 9. I would shorten the growth one-half each year, for the first four years, then be guided by the condition of the trees. It would be quite a job to thin the fruit on a thousand trees, but believe it would pay.

Question 10. I think that heavy winds are a great help to the blighting of trees, as it stops the flow of sap.

Question 11. Never worm any.

Question 12. It stops the growth of the wood for the next crop. I found that lime, dry, was the best thing for them, put on when the dew was on.

Question 13. Do not know.

Question 14. Not to my knowledge.

Question 15. I believe it pays, and gives the fruit a better flavor, but I am not speaking of ice refrigerating. I know nothing about that.

Question 16. Gather about ten days before you want it for market, and put it in a cold place, ship in crates or baskets.

Question 17. Bartlett first, Louise Bonne de Jersey second, Lawrence third, Duchess fourth. Peaches easiest.

ANSWERS RECEIVED FROM GROWER, NO. 5.

Question 1. Duchess.

Question 2. Standard.

Question 3. Best land for corn.

Question 4. Standards many years. Dwarfs no account.

Question 5. Spring, in blossom.

Question 6. No.

Question 7. Plough shallow in Fall. Harrow in Spring.

Question 8. Bone and Potash.

Question 9. No pruning.

Question 10. Question too hard.

Question 11. No answer.

Question 12. No answer.

Question 13. Fall ploughing kills curculio.

Question 14. No answer.

Question 15. No answer.

Question 16. No answer.

Question 17. Duchess.

Is pear culture profitable with you? No.

ANSWERS RECEIVED FROM GROWER, NO. 6.

Question 1. Bartlett, Lawrence, Early Sugar, Bell Pear, for Standards. For Dwarf, Duchess.

Question 2. Standards, they come into bearing nearly as soon as dwarfs, and they last so much longer.

Question 3. Light, loamy soil, (not too sandy or gravelly,) the ground nearly level, just rolling enough to carry the water off.

Question 4. Standard. I have one 25 years old. The Dwarf orchard planted at same time is gone some eight years.

Question 5. No answer.

Question 6. No answer.

Question 7. The early Sugar and Bell pears have paid me better than any other pear, for the last eight years. Two years ago I budded a lot of Lawrence with the Sugar, after they were planted out two years.

Question 8. Commercial fertilizer in quantity of 500 lbs to the acre.

Question 9. 20th June I trim and cut back one-half of this year's growth. I have hand-thinned fruit say one-

half, and the balance made as much afterward in increased size of fruit as it would have made if not thinned.

Question 10. No answer.

Question 11. No answer.

Question 12. I have the slug. I think it would permanently injure the trees if not destroyed. I use Paris Green in water.

Question 13. I think not.

Question 14. I have not.

Question 15. No answer.

Question 16. Pick just before they are ripe when they come from the stem, easily. I ship in boxes but cannot say which pays the best to ship in.

Question 17. Bartlett first, Duchess second, Lawrence third. Is pear growing profitable with you? Pears have paid me well, what few I have. The early pears the best.

ANSWERS RECEIVED FROM GROWER, NO.7.

Question 1. My trees in bearing, all Dwarfs, are: Howell's, Red Harvest, Lawrence, Buffum, Bartlett, Louise Bonne de Jersey, Duchess, and Vicar of Winkfield. They were selected for me by a Pennsylvania Nurseryman, before I had any experience. I value the

Bartlett, Duchess, Lawrence, Howell, Buffum and Vicar very highly. The Louise Bonne de Jersey needs hand-thinning to give good fruit. While I think three or four varieties might be added to my list to advantage, still I think it an excellent one. The Lawrence is a splendid pear and I value my Vicar very highly.

Question 2. Have had scarcely any experience with Standards. My little orchard planted about 1873, some 56 trees, all Dwarfs, commenced to bear in three years, and have given me, almost uniformly, good crops ever since. Some years a few trees have *rested*, but with 8 varieties I have always had plenty of good fruit. I believe *most thoroughly* in *Dwarfs*, my faith being based upon my experience with my own success. They must be well fed, the trees must be carefully selected. They require careful pruning and cultivation.

Question 3. My soil is a heavy upland clay, but made rich by various fertilizers. Stable manure, (composted,) lime, potash, salt, phosphate, bone and compost made from kitchen garbage, sod, privy water, lime, salt, etc. I have no experience with any other kind of soil, personally ; my location is very much exposed. No protection from our fierce winter winds.

Question 4. My Dwarfs were three years old, planted, I think, 1873. Have borne, as stated, with little intermission for ten years, and most of them are vigorous and in good condition to-day, promising well

for many years to come. I have lost one tree by disease, and then I was away from home for ten months. I think I'd have saved it, had I been at home.

Question 5. Am not competent to give an opinion. Judging from my own experience with severe winters, since my trees have been in bearing, with high cultivation and proper pruning, there is little to be feared from frost in this locality, at least, from severe winters, as I have had abundant crops after such.

Question 6. Last winter, 84-85, was a very severe one. All my trees bore good crops this season, except the Lawrence, which had been full the two preceding years. Hence, I repeat that, with trees properly cared for, fear of frost should not deter any one from growing this magnificent fruit.

Question 7. My trees are planted 8x12. Hence, could only plough the first two or three years. Have dug (spaded) the ground once per year, in the Spring, and occasionally, again in the Fall, and kept weeds down during summer with hoe or hand cultivator. Dig as soon as ground is dry enough in Spring; spade deep. This would not pay on a large scale, but not having the experience, cannot recommend a substitute plan. But I am well convinced that pear trees require, or are better to have, the soil thoroughly worked, at least, once per year. If in the Fall, then after growth has ceased.

Question 8. As stated, have used stable manure composted. (If applied fresh, would put it on in the Fall or winter. Lime, Phosphates, Potash, Kainit, Bone, Salt, and a mixed compost. I regard the lime in moderate quantities with *Bone* and *Potash* as requisites. Would use wood ashes freely if I could obtain them. Bone, at the rate of 1000 lbs. to acre, yearly. Potash, a pint to a quart to each tree. Am not positive as to correct quantities of potash. Think Fall best time on the whole.

Question 9. I prune largely in the Spring, but have made it a rule to take out a superfluous limb at almost any time when noticed. Believe Spring is the best time to prune. I varnish all wounds of any size with copal and alcohol. I have not hand-thinned fruit sufficiently to speak of results, but am of opinion that it will pay well, both for the sake of size and quality of fruit, and for the health of the tree. I think it especially necessary for Howell and Vicars. The former, on quince stock, at least, will injure themselves on rich ground, by *large yearly* crops. Keep ground rich and they outgrow the cutting soon.

Question 10. Have no theory. I apply the saw promptly at first appearance, far down below the diseased portion of the limb, making sure to get well below any *spots* of blighted bark, even. Have never lost but one tree from blight, and it died when I was away ten months, as stated. Some of the most vigorous trees in

my orchard now, were blighted years ago, and treated as above. I thoroughly protect the wounds with varnish.

Question 11. Have suffered very little from worms in pear trees. If found, I waste no time before destroying them. I think I have only found them in one or two trees.

Question 12. When trees were young, I had to combat the slug each season, but after three or four years the trees became too vigorous to be injured by them. I used any dust, powdered lime or coal ashes, sifted or thrown over the trees. If allowed to strip the trees of leaves when young, think they would be greatly injured thereby.

Question 13. It is the worst enemy I have to contend against. They sting my fruit badly. I think it would pay to set lamps over tar, or some sticky substance, at night, during the season when they deposit their eggs. Would be thankful for any prophylactic treatment you may be able to suggest.

Question 14. None noticed in my orchard.

Question 15. I have no experience. But if the Bartlett could be kept in good condition until our peach "glut" is over, I think it would pay here in Delaware.

Question 16. Having used the greater part of my fruit for table, in canning and drying, I have little ex-

perience. I have sold, for two years, our surplus fruit in Wilmington market, and at the orchard, to our citizens at good prices. Pears should be gathered as they mature, as soon as they will part from the twig when yet hard, and stored on shelves in thin layers, in dry cool fruit-room or cellar.

Question 17. I think the Bartlett and Duchess have the finest flavor when evaporated. The Howell evaporates nicely but has not so fine a flavor. No experience in evaporating peaches. Dwarfs need to be well supported for several years to prevent heavy windstorms from breaking them off at the point of union between the pear stock and quince. I set mine so that the point of union was four inches under ground, and adding fertilizers and composts, they are, probably, now six inches under ground. The greater part of my trees are rooted from the pear stock, making them in part standard ; they should always be set as above to secure this result. Am sorry not to be able to answer more reliably and concisely.

Is pear growing profitable with you ? Pear growing has paid us well. My experience leads me to believe, that, had I purchased a good farm in Delaware, Maryland or Virginia, twenty years since, and planted in Standard and Dwarf pears, I should have made a handsome pecuniary success of it.

ANSWERS RECEIVED FROM GROWER, NO. 8.

Question 1. Beurré, Giffard, Manning's Elizabeth, Bartlett, Lawrence, same do well as Dwarfs.

Question 2. I prefer the two together, 4000 on ten acres. On ten acres plant 1000 Standard and 3000 Dwarfs. Standards twenty feet apart, Dwarfs ten feet between.

Question 3. Good, sandy land, highly improved, not too much in valley. If too low, liable to blight.

Question 4. No one knows. I suppose many peninsula pear trees are one hundred years old ; I know Dwarf Bartletts thirty years old, doing well now.

Question 5. Spring.

Question 6. As many pear orchards do well in New England, suppose the trees are not injured by cold weather.

Question 7. Early in Spring ; then cultivate often through season. This for young trees, up to ten years of age ; after that, I believe, they should not be ploughed so much.

Question 8. Stable manure, bone meal, kainit and lime.

Question 9. Standards ; cut out water sprouts. Dwarfs ; head back $\frac{1}{3}$ in August. Never hand-thin ; two long a job for me.

Question 10. Give it up, as all others have done. Cut off branch and burn it *at once.*

Question 11. No.

Question 12. Yes. Dust the trees.

Question 13. Yes, very much.

Question 14. No.

Question 15. Cannot say. Here it cannot be done to profit. Too many rot, it hurts the flavor.

Question 16. Gather when pears (sound ones) begin to drop; it does not hurt them to drop. Ship in peach baskets.

Question 17. 1st Bartlett, 2nd ditto, 3d ditto, 4th ditto; all other kinds are hard to sell.

Is pear-growing profitable with you? Ever since my orchard has been in bearing it has paid better (much better) than peaches.

ANSWERS RECEIVED FROM GROWER, NO. 9.

Question 1. Bartlett and Lawrence for Standards; Duchess for Dwarfs.

Question 2. Standards; they live longer and bear more fruit.

Question 3. They have done well on all soils, but, perhaps, a good mixture of clay may be the best. Pears,

generally, were not good this year, but J. M. Chambers, of Dover, tells me that the best he bought came from my orchard, not far from the bay. Soil rather heavy.

Question 4. I have both, twenty-seven years old.

Question 5. Spring frost. The best crop of pears I have ever had was in 1880. The preceding winter was the coldest we ever had here, the mercury running as low as 18° below zero. The peach crop was entirely destroyed here.

Question 6. No answer.

Question 7. Early in Spring. Shallow. If I see any sign of blight I stop all cultivation.

Question 8. I use none ; some manure very heavily. My pears, without manure, are better than theirs with manure, but their trees are healthy and bear regularly every year.

Question 9. I have no particular system of trimming except to shape the tree properly and keep off water sprouts. I have hand-thinned, but with no good results.

Question 10. No one knows, and of course the treatment is empirical.

Question 11. No.

Question 12. Yes, but not so much within the last two years. I cannot say that they injure my trees. I spray whale oil soap over them.

Question 13. Very much.

Question 14. No.

Question 15. Have never tried it.

Question 16. My best market has been at home, to the canners. In 1884 I sold to a Cincinnati dealer at 65 cents all through. This year I sold to a Dover evaporator for 43 cents per basket. I evaporated all the canners did not want until my evaporator was destroyed by fire two years ago. Pears sell very slowly in the city markets.

Question 17. Lawrence, first; Bartlett, second. Peaches. Pears should be evaporated more slowly than peaches or with less heat. If hurried too fast their edges become dark, and this spoils there appearance. Some pears are not worth evaporating. Pear-growing is very discouraging. The trees are expensive, and after nursing them for twenty years, you do not know at what moment they may be stricken dead with blight. The market is very easily glutted and I do not think they ever will be grown very extensively. Authors differ widely as to the management of the pear orchard. Some say heavy manuring and frequent cultivation is best, others pursue an opposite course. Some say that starvation causes blight, others, that manuring and cultivation produce it. I have four Bartletts, dressed for the last four years, annually, with a load of good horse dung. The blight

has never hurt my Bartletts until two years ago, but two of these manured trees contracted the disease then. One of the healthiest pear trees I own is a Beurré d' Anjou in my yard. The grass has never been disturbed around it for sixteen years, but the yard is well dressed with manure and wood ashes every year, The blight has hurt my Beurré d' Anjou planted in my orchard and well cultivated, terribly. They were both out of the same nursery and planted at the same time. A very extensive nurseryman and fruit grower in New Jersey in whose judgment I have the greatest confidence tells me to cultivate pear trees until they are pretty well grown, then let them remain in sod, and manure them without cultivation. This plan just hits the tree in my yard. I have a block of trees in my orchard which I sowed in clover and mowed the clover around them for several years. During that time there was no blight among them, but not being manured they made slow growth of wood. When the clover ran out I commenced cultivating them and the blight has nearly ruined them. Another block of Beurré d' Anjou was put in clover at the same time. The trees were thrifty and vigorous while the clover was growing around them and bore most enormous crops of elegant pears, but as soon as we resumed their cultivation, the blight made its appearance and now many of the trees are dead. I planted eight Bartletts nearly thirty years ago in a very rich piece of land along

side my garden fence. They have never been tilled nor mowed around, but have born splendidly. One year I got over one hundred dollars from the eight trees. They have been free from disease. I have become very much discouraged with pears during the last three years, and have almost concluded to plant no more. The slugs have nearly all gone from my trees, but the deadly fire-blight has taken their place, and I can't tell where it is going to end. The *leaf-blight* has also given me a great deal of trouble. It does not kill the trees but causes them to shed their leaves, and thus ruins the fruit. Some of the nicest pears are not worth growing on account of the leaf blight. The tree blossoms, and sets a fine crop of fruit, but in August every leaf drops off, the fruit remains on the tree, but never ripens. All these trees I graft with Bartletts. So you will see that between the grafting for the leaf blight and the digging up for the fire-blight, I have had a sorry time with pear trees. Had I known as much before I began with them as I do now, I hardly think I should have gone into them as largely as I have. But I have made a bad bargain and am trying to make the most out of it I am able.

ANSWERS RECEIVED FROM GROWER, NO. 10.

Question 1. One thousand Standard Bartlett, one thousand Dwarf Duchess.

Question 2. I prefer those two varieties, one dwarf, the other standard ; they both come in bearing very early and about the same time.

Question 3. Rolling land, clay sub-soil.

Question 4. About twenty years each.

Question 5. In the spring.

Question 6. No.

Question 7. After a few years they are better without any cultivation.

Question 8. Bone, about 400 lbs. per acre.

Question 9. Standards need little prunlng. Dwarfs cut back about one half of summer's growth for several years.

Question 10. Not able to answer. Cut back heavily.

Question 11. No.

Question 12. Yes ; no ; none.

Question 13. No.

Question 14. No.

Question 15. Never do so for market, do not think it pays.

Question 16. Hand-pick them, ship them in boxes nearly tight.

Question 17. Bartlett.

Is pear culture profitable with you? It has been very profitable.

ANSWERS RECEIVED FROM GROWER, NO. 11.

Question 1. Three-quarter Bartletts and the rest divided equally Howell and Lawrence. Neither of them should ever be dwarfed, they do not do well on quince. I would never plant any Dwarfs but the Duchess.

Question 2. Nothing pays so well as the Bartlett, and as I say above, it should never be dwarfed. The Howell is a profitable pear but not so well known as Bartlett. The two most profitable pears are Bartlett and Duchess.

Question 3. Good corn land a little stiff is the best, and ordinary rolling land not, exposed to strong winds and not wet in the sub-soil.

Question 4. That depends in these days whether the blight is bad or not, and no one can foresee that.

Question 5. I have never had any injury from frost. I think chilly east winds hurt the germ in this climate more than frost.

Question 6. I have never known it do so in this locality.

Question 7. I plough early, as soon as the ground is in condition for it, with a one-horse plough, and keep

the ground cultivated enough to keep the weeds under, and until well-grown, plant beans, sweet corn, etc. While young, plough shallow near the trees, but ordinary depth away from them.

Question 8. Stable manure and muriate of potash. About 400 lbs. of potash once in three or four years and a dressing of manure yearly, especially while you crop the land.

Question 9. Prune in March, usually, so as to make a good shaped tree. I always thin Bartletts and Duchess; some years one-half or two-thirds of the fruit, thereby getting great increase in size and improvement in flavor.

Question 10. I have not been able to form an opinion, and all I do is to cut it away as soon as it shows itself.

Question 11. Standard pear trees have no worms, and if the Dwarf are set right so that the quince is covered by the soil, they will not be troubled by the borer.

Question 12. Slugs check the growth of young trees. Dry dust is as good as any thing to put over them, by the hand.

Question 13. There is no pear curculio like the plum, apricot, etc., but a worm similar to the common apple worm; and in thinning, if late enough to have it show, thin out the wormy ones.

Question 14. No.

Question 15. If you have enough to make it an object, you are more independent of the market, and when you do not wish to keep them into the late autumn or winter, they are better to be picked as soon as they will part from the stem readily and ripened in a cool, dark place.

Question 16. Thus far I have prolonged the season all I could, and depended on the local market. Am not very well posted on these questions.

Question 17. No experience. Is pear growing profitable with you? So far, pears have paid me well, as with the market garden I have had facilities for marketing when in just good condition for retailing, but when my young orchard comes to bearing I shall have to ship them, and probably, they will not pay so well. Though from the nature of the fruit I do not think there is much danger that good pears will not sell in the eastern markets, as ours are ripe nearly a month earlier than any in New York or New England.

ANSWERS RECEIVED FROM GROWER, NO. 12.

Question 1. Have no experience south of Wilmington.

Question 2. Standards not subject to borers and are in general more healthy. Dwarfs are usually budded too

high, and not planted deep enough to cover the quince stock.

Question 3. Clay loam. If planted on the north side of a hill the blossoming is retarded and thus escape late frost.

Question 4, Have no experience or information.

Question 5. In Spring by late frost. I have seen, however, the tender Fall growth seriously injured by Fall frost.

Question 6. I have never known pear buds to be killed by the cold.

Question 7. A committee of the American Pomological Society, appointed for the purpose, reported that pear trees did better in sod, being less subject to blight, and were more healthy generally. The committee traveled the United States, north and south. Their report was adopted.

Question 8. Wood ashes all the time. If not to be had, make it of four per cent. potash, thirty-four per cent. lime, and two per cent. salt, balance soil. The best result from stable manure, was when applied very heavy in the Fall around the trees, and spread in the Spring.

Question 9. It depends upon the object desired. If for growth, trim while dormant. If too much growth and too little fruit, trim while in growth. Thin out

parallel or crossing limbs at any time, but July and August are best. Also root prune if the tree has full size and no fruit.

Question 10. That is a mystery. It is certainly a weakly condition of the tree which is greatly prevented by the wood ashes. No remedy but cutting out, and it should be severely done far below the affected part.

Question 11. Standard pears are not wormy, and Dwarfs should not be, if properly budded and properly planted.

Question 12. Slug is common and a serious injury to the tree. Dusting with air slaked lime or even with dry pulverized clay, will destroy them.

Question 13. All fruits more or less.

Question 14. I have not noticed any.

Question 15. I have no experience, and but little information. I question its paying. I think Chas. Downing abandoned his fruit-house.

Question 16. Most pears require picking ten days or two weeks before ripe, and if your market is distant, they might be shipped as gathered, and will ripen on the way. If near, store in a cool room or cellar and market when ripe.

Question 17. I have no experience in evaporation. My experience is that it is not the *cold* that kills plants,

such as roses, evergreens, etc., and perhaps, peach and other buds, but the sudden change when the sun strikes them. Florists always shade frosted plants, and thoroughly wet them to draw the frost gradually. I therefore believe that peach buds would be less injured on the *north* side of a hill, the sun's rays striking more obliquely.

Is pear-culture profitable with you? I am not at present cultivating pears, except having charge of a small orchard for another party, on a small scale. It is profitable.

ANSWERS RECEIVED FROM GROWER, NO. 13.

Question 1. Have rather limited experience with full Standards, but would prefer Bartletts. For Dwarfs, I prefer Lawrence, Duchess, Flemish Beauty and Bartlett.

Question 2. Standards, as they bear equally as soon for me. And they are longer lived and produce more fruit, from the fact the tree is larger, although half standards have done well for me.

Question 3. Stiff soil, with red clay sub-soil. If possible, should be sheltered from the northwestern winds, and a valley would be far preferable.

Question 4. I have one Standard tree, which is sixty years old, and still gives a profitable crop. I have no further experience with Standards, but my half

Standards have been bearing for twenty years, and still yield good crops.

Question 5. Late frost in Spring.

Question 6. I have never suffered from winter killing.

Question 7. As early as possible. Eight inches; plow once a year and cultivate often, and in my judgment no weeds or grass should be allowed to grow in the orchard.

Question 8. My principal fertilizer is coal ashes, and well rotted manure. Apply the last of November or first part of December, around and near the trunk of trees, about a shovel full of former, and two forks full of latter, occasionally, four hundred pounds of Kainit to the acre during fall or winter. Every Spring, cover ground liberally with stable manure.

Question 9. Prune very little, merely to keep the branches from chafing; very seldom hand thin.

Question 10. I have never had but one variety to blight, Vicar of Winkfield. As cure, I cut away the branches as they would blight, but I think the best remedy is to take the tree out.

Question 11. I have never had occasion to worm, other than to look, occasionally, in case it would be necessary.

Question 12. I do on my young dwarf orchard, but by using air slaked lime, we are getting *rid* of it. I do not think it injures the trees permanently.

Question 13. It does, and seems to be on the increase.

Question 14. None.

Question 15. Have no experience.

Question 16. As we sell our fruit in Wilmington market, retail, we prefer to hand-pick, put away in fruit room, cover with blankets uutil well colored, and place in small baskets.

Question 17. No experience, but should suggest the Bartlett.

Question 18. My pear crop pays the best of any crop we raise.

ANSWERS RECEIVED FROM GROWER, NO 14.

Question 1. Bartlett and Lawrence are the best I have any knowledge of. I have the Beurré d'Anjou, a very fine pear, but will not keep so well as other varieties. It has very fine flavor. I only have the Duchess as Dwarf.

Question 2. I would prefer both (Standards and Dwarfs). I find in my orchard, this year, my Standards bore more fruit, and some years it is the other way.

Question 3. I want the location high, loamy and red clay sub-soil. I have part of my orchard on either flat land or a valley. The trees do not do well there, but where it is higher the trees are more thrifty and fruit better. We have no hills or slopes in our location, therefore, I cannot say as to that. Our land is rather level.

Question 4. I suppose it depends entirely upon location, cultivation, fertilization, etc., as to the life. My orchard was set out in May, 1870, and, I believe, has borne fruit most every year, or as far back as I can remember, and the trees are healthy and look good for many years.

Question 5. I have known my trees to be full of blossoms with but a small quantity of fruit, Then again no blossoms ; I think they are very much like a peach ; if very cold, the germ will be destroyed, or, if a late frost, when in blossom, they will be killed. It is hard to tell, unless a record is kept from year to year.

Question 6. The roots of a Pear tree are close to the surface, and are subjected to extremes of heat and cold.

Question 7. I have not been tilling my orchard for the last two years. Have it in grass ; let the hogs run in it. When Pear trees arrive at a certain age, they will not bear the cutting of roots, which is unavoidable if you

plough, for the ground is a mass of roots. I believe I have lost good trees from that cause, but young trees should be ploughed and cultivated very shoal.

Question 8. I use manure broadcast. I cover in the Spring, or, when I have the time, in Spring or Fall; I prefer the later, as you ought to get some benefit in next crop.

Question 9. Prune slightly, have never hand-thinned, but believe if I had done so on several crops, would have paid. It is too great a risk here; as a general thing, the trees thin themselves.

Question 10. The slug, as some call it, eat the leaves; of course the tree or limb is affected, or, in other words, the leaves to a tree are very much the same as the lungs to a being. I have thrown dust over the tree, and wherever it strikes a worm, it will fall.

Question 11. I did this Fall, but did not find any worms or grub. We hoe around and examine around the roots of trees. I think the hogs have an excellent tendency to keep the trees healthy, as they will eat the fallen fruit.

Question 12. We have them, and I notice the trees look healthy, but the fruit has been knotty and small. It may grow out of that in time. Sometimes the tree dies.

Question 13. Can't say.

Question 14. Have not seen any.

Question 15. Most varieties are better when pulled early and ripened in a dark, cool place. But we have too many trees to contend with; the early pears bring the money. The northern States can grow much finer pears than we can.

Question 16. I think crates that hold a peach basket will pay best. The late varieties I ship in baskets, as the market is generally glutted or over stocked. The Bartlett is the pear for us, for profit, as it comes early.

Question 17. I cannot say, have not had any experience in drying. I have a rather poor opinion of pears for the last two or three years, as there are so many grown, and not the demand there used to be. I don't think I would bother them, unless it might be the Bartlett. I found my pears did not keep well this year. My Lawrence generally keep until the first or middle of December, but this year they rotted on the tree, to an extent, and did not keep more than two weeks after picking. My experience and observation is rather limited on pear culture, although I have a fair sized orchard, but have not studied the pear much.

ANSWERS RECEIVED FROM GROWER, NO. 15.

Question 1. 400 Bartletts, 100 Howell, 50 Vicar, 100 Doyenné d'eté, 50 Buffum, 100 Beurré d'Anjou, 100

Lawrence, 50 Bergamot and 50 Seckel. Do not know much about Dwarfs except Duchess.

Question 2. Standards; they bear more and longer.

Question 3. Loam, with sandy sub-soil. Southwest or southeast side of hill.

Question 4. Have not enough experience to say.

Question 5. In Spring.

Question 6. Think not.

Question 7. Early in Spring, as shallow as possible, once. Harrow and one horse cultivator.

Question 8. Stable manure and ashes, in Winter or early Spring, broadcast.

Question 9. In Spring, early, thin out centre and cut off unsightly limbs. Did it once with good result.

Question 10. Fertilizing or cultivating late in the season causing the trees to grow vigorously in the Fall, and the wood does not ripen before Winter. Cut back of it five or six inches.

Question 11. No.

Question 12. Not now, had them once, used dry dust when the dew was on.

Question 13. I think it does, causing them to have a knot on one side.

Question 14. No sir.

Question 15. A cool, dry place is best to keep them. Have never tried a refrigerator. Think there is more money to me in selling pears in their season.

Question 16. When they will come off in the hand by a slight pull ; kept until they are a pale yellow ; not too long ; in peach baskets.

Question 17. Have no experience. Is pear growing profitable with you ? Fairly so, the blight has injured many of my trees.

ANSWERS RECEIVED FROM GROWER, NO. 16.

Question 1. Standard : 50 Clapps Favorite, 400 Bartlett, 150 Sheldon, 50 Duchess, 200 Seckel, 50 Beurré d'Anjou, 50 Howell, 50 Lawrence. 1000 Dwarf: Duchess, Bartlett, Louise Bonne de'Jersey, Vicar of Winkfield.

Question 2. Prefer Standards, as they come into bearing nearly as soon as Dwarfs, are longer lived, make larger and more productive trees, less liable to accident from wind and teams, also not as susceptible to blight.

Question 3. Clay loam, not heavy or light, with good drainage, hill side with moderate slope southerly, if possible, wind-breaks of pines or spruce on north or west sides I think of great advantage.

Question 4. No answer.

Question 5. Spring.

Question 6. Do not think they are often injured by low temperature in this climate, if wood is fully matured.

Question 7. Plow early as the ground will permit; shoal, not over 4 to 5 inches, then keep weeds down and the ground in order with harrow and cultivator. Do not like too many varieties for market orchard.

Question 8. Barnyard manure and ashes.

Question 9. Prune every Spring. Never hand-thin to any extent.

Question 10. Cannot tell the cause. Cut the limbs below any blight on bark.

Question 11. Not often, have punched the borers with wire, occasionally.

Question 12. Never have been troubled with slugs. Know of one orchard ruined by them. They could find no remedy.

Question 13. To some extent; some seasons more than others.

Question 14. Have not noticed any.

Question 15. No answer.

Question 16. No answer.

Question 17. No answer. Is pear growing profitable with you? Yes.

ANSWERS RECEIVED FROM GROWER, NO. 17.

Question 1. Standard—Manning's Elizabeth, Bartlett, LeConte and Kieffer. Dwarfs —Manning's E., Bartlett, Howell, and Duchess.

Question 2. I prefer Dwarfs, for the reason they blight less on my soil. In the future I shall plant all Dwarfs except the Le Conte and Kieffer. They have to be as Standards.

Question 3. A medium loam with open sub-soil. I prefer high, rolling land. Easterly exposure, if possible.

Question 4. I do not know. I have a vigorous dwarf Duchess tree that was planted in 1856.

Question 5. In the Spring.

Question 6. No.

Question 7. I plough as soon as the ground is dry enough in the Spring, from three to four inches deep, only once. Then we keep the ground thoroughly worked with the cultivator and spring tooth harrow until some time in August.

Question 8. I use dissolved Ammoniated Bone, 300 lbs. per acre, and well rotted stable manure, which I compost in the fall and apply it around the trees the following Spring, just before ploughing. Stimulating manures should be avoided.

Question 9. We prune young trees, but bearing trees require very little. It will pay to hand-thin the fruit when trees are overloaded.

Question 10. I don't know. When a tree blights, we dig it out and plant another.

Question 11. No.

Question 12. Yes. It does. I use White Hellebore, two pounds dissolved in eighty gallons of water. Apply it to the trees by means of Fountain Pump.

Question 13. Very rarely.

Question 14. No.

Question 15. Have had no experience.

Question 16. Pick carefully; pack in baskets, and keep in a cool dry-house.

Question 17. Bartlett, LeConte, and Kieffer. The pear is much easier to evaporate than the peach.

Is pear-growing profitable with you? Pear-growing is profitable with me, but it requires great attention. I fruited the LeConte pear this season, and am very much pleased with it. It ripens after Duchess, and is of fine flavor. It should be planted on its own root, as it is too strong a grower for any other stock. I believe it is blight-proof.

ANSWERS FROM GROWER, NO. 18.

My experience in the twenty years of growing pears is not satisfactory, so far as paying for land and labor goes, but I do not condemn the culture of pears. I think that I selected a flat piece of land, which was not adapted to the healthy growth. I would not be afraid to plant an orchard on your farm where Mr. Hill resides.

1st. I would plant 999 Bartletts, out of 1000 Standard pears, for this locality.

2d. The Duchess are the best and only dwarfs, so far as my trial goes, that pays. I prefer the Bartlett above all others, because of their good quality for shipping, and regular bearing qualities, and if the slug should strike them so as to injure the fruit, you can get something out of them by drying them. They are the only pear that pays to dry. The Duchess are good bearers, and if planted properly, will live to be old trees. I have them twenty years old, looking fresh and in regular bearing, but the fruit is only fit for market in a ripe state ; will not dry. In starting an orchard, a small quantity of ashes around the trees with good cultivation is best.

3d. The best land is high, well drained, with a little gravel sub-soil.

4th. I cannot tell how long a standard pear will live, but my orchard is twenty years old, and the Duchess with the Bartletts, are alike vigorous.

5th. I have never known them to be injured with frost only in Spring, when in full bloom.

6th. In 1881, when the peaches were all killed, the pears were not injured.

7th. I do not want to plough until the ground is in good order; for the first three years, only for a few furrows around the tree; regular ploughing after that, two to three inches, after they get to regular bearing, is about the right depth. Corn or potatoes can be alternated as the best crops, and after three years, cultivate without any crop for a year or two. I found that by letting my orchard lay in grass after the blight struck it, I got entirely *rid* of the *disease*. I may be mistaken, but my impression is that high cultivation before they come in full bearing, is conducive to blight. I found that the blight always commenced about the middle of June, and always commenced on the new growth, and by letting my orchard go for three years it ceased to appear, and since that time I have not worked it only about every two years, leaving a grass plot around the trees. They bear regular and good fruit. I do not think that any *fertilizer* should be used very heavy. Wood and coal ashes I have found to be all that is wanted on my soil. A mulch of straw in the Fall would be of use while young. I trimmed until I got them in good shape. After they begin to bear, I think they need but little trimming. I have never found worms to trouble them. I have never

been troubled with slug. If they continue, they will injure the tree. Some say, who have been troubled with slug, that dry dust of lime, or ashes, or road, sprinkled over the trees in the morning when the dew is on, is a remedy. I never heard of the curculio injuring pears. We have no new disease or insect in our neighborhood. I answered the rest of your questions on the paper you sent me; if you will excuse me for my long epistle, I will close; it will give me pleasure to answer anything I have omitted.

Question 15. If they could be kept when we have a crop of peaches without too much expense until the middle of November so as to have them firm (I speak of the Bartlett) I have no doubt that they would bring a better price.

Question 16. I have no doubt that a nice, oblong box, something shape and size of the orange box, with paper lining placed careful, would be the best package to put in when hard, and then they should be kept in a dark place to ripen.

Question 17. The only pear that I have in my orchard that is fit to dry is the Bartlett.

In my letter I said that in selecting a pear orchard I would plant 999 Bartletts out of 1000 Standards, but in thinking over my orchard I overloooked the Lawrence. They are a Fall pear and come in a good time and sell

well. The Bartlett pear does not take as much heat to evaporate as the peach. It is more like the apple. In planting out an orchard of 1000 standard pears I would first select 800 Bartletts, 175 Lawrence and 25 Seckel. I would plant the standards, say 20 ft. square, and in the centre, as dotted, the Dwarfs.

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Is pear growing profitable with you? No answer.

ANSWER RECEIVED FROM GROWER, NO. 19.

Lower Delaware.

DR. JOHN J. BLACK,
New Castle, Del.

Dear Sir:—I am in receipt of your printed inquiries concerning the growing of pears, and regret that I am unable to send you a satisfactory answer. I do not regard the pear crop as a profitable one for us, and have never engaged largely in its culture.

ANSWER RECEIVED FROM GROWER, NO. 20.

New Castle County, Del.

Your list of questions was received, last week. I do not think I can answer any of them so that I would be willing for a person to put any faith in what I said. I have not interested myself in pear culture since I have

been farming. When our orchard first came into bearing we thought some varieties paid fairly well but we were troubled with blight and slug. The orchard has passed out of my hands —— owning the farm where the pear orchard is. If it were mine I would have had it pulled up long ago; it still stands, worth nothing, I consider. I am very sorry I cannot give you more definite information, but our experience with pears is not very favorable, owing to blight and slug.

ANSWERS RECEIVED FROM GROWER, NO. 21. A NEW JERSEY GROWER.

Question 1. 200 Lawson, 200 Bartlett, 200 LeConte, 400 Kieffer, 1000 Standards: 200 Lawson, 200 Clapp's Favorite, 200 Bartlett, 200 d'Anjou, 200 Duchess, 1000 Dwarfs.

Question 2. We prefer Standards to Dwarfs because most varieties succeed better on pear than on quince. They are longer lived and produce more fruit.

Question 3. We think the best soil for a pear is a sandy loam with sub-soil of clay or gravel, and on hill. They are less liable to blight than if in valley.

Question 4. Pear orchards should continue in profit, if properly cared for, fifty to seventy-five years for Standards, and twenty-five to thirty years for Dwarfs.

Question 5. We think the pear crop is most frequently injured by frost in Spring.

Question 6. Have never known pear buds to be killed by low temperature in Winter.

Question 7. We plow early in Spring, 4 to 6 inches deep and keep thoroughly cultivated until about middle of August ; after which we think best to have no cultivation, that the wood may ripen up. In Fall, on approach of Winter, plow furrows to the trees, leaving clear midway between the rows to carry off water.

Question 8. We have used Kainit and wood ashes with good results, sown broadcast in winter.

Question 9. We prune young trees by cutting off two-thirds the young growth in Winter, and thinning out branches where too thick. As the trees become older and make less growth, we take off one-half the young growth and after they come into heavy bearing they will need little, if any pruning. Where the fruit is set too thick, it will improve the size and quality by thinning it.

Question 10. We do not know the cause of pear-blight. The way to treat it is to cut off the affected part and burn it.

Question 11. The pear tree should be wormed at the collar in Fall of year, same as peaches.

Question 12. We have slug ; they check the growth of the tree for the present season by eating the leaves ; don't think it any permanent injury unless continued yearly.

Question 13. No answer.

Question 14. Have not observed any.

Question 15. By cold storage, some varieties, such as Bartlett, that ripen at times the markets are overstocked, may be held to advantage. Where kept in damp or wet cold storage, we think the quality is deteriorated ; when dry it is not affected.

Question 16. The best manner of gathering the fruit is by light step ladders of convenient size for larger trees. We pick in baskets. For shipment, pack in bushel boxes, furnished by New York commission men.

Question 17. We believe the Kieffer to be the best pear for evaporating, canning, or preserving. Second, LeConte.

Is pear growing profitable with you? The following sorts are profitable : Lawson, Bartlett, LeConte, Kieffer, and Lawrence. Lawson being very early, beautiful, and productive, we think will be very valuable in Delaware and Maryland.

ANSWER RECEIVED FROM PEAR GROWER, NO. 22.

DR. JOHN J. BLACK,

New Castle, Delaware.

My Dear Dr. Black :—I think I had better give you my experience in the pear business in my own way instead of answering your printed questions in detail.

About twenty-one years ago —— harrassed me until I gave him an order for pear trees. I frankly told him I could not tell him what varieties to send me, but he declared he knew, and would send me paying kinds. Before he sent them, I went to ——— and asked him to release me from the order, telling him I was of the opinion I was leaving too much to him. He declared he knew the paying varieties and would send them to me. He sent me a great many kinds—all sorts of French names—but only three or four were worth anything, Lawrence, Bartlett and Duchess, were good. The others were bought as refuse from a nursery in New Jersey, and from this refuse I got most of my trees. A good many were dead when they arrived, which the seller, to me, acknowledged with tears in his eyes, and left the amount of his bill to me to determine. I paid the whole amount $800,when, in truth, I did not owe him one cent. He really was in debt to me. I afterwards found he was in the habit of crying when he had an unjust account. Bartlett, Duchess and Lawrence have always borne well with me, and paid handsomely, until this year. Duchess is a Dwarf pear and does well. I have seen it as Standard, but it did not do well. Bartlett and Lawrence bear so soon, and do so well as Standards, it seems to me, useless to have them any other way on my stiff soll, (stiff yellow clay). I cultivated my trees until they were six or seven years old ; I then penned my sheep in

the orchard at night, when the snow was off the ground; when snow is on the ground the sheep will bite the trees. Sheep manure Pear trees better than any other way I ever saw them manured. Whether the sheep kept off the slug, or not, I can't say, but my trees have never been troubled with slug, and my neighbors' have. When I first sent pears to market they wanted them ripe; now the dealers want to ripen them themselves. If they are all ripe they have to use them at once. If they are not ripe they can hasten them or keep them back. There is no pear equal to the Bartlett for canning or drying. I believe there will be a great demand for evaporated Bartletts. I find the northern pears are sent to market in kegs; they bring more than ours, but they are said to be finer and smoother than ours. I replanted the dead trees I got from ——— with Bartletts, and I did right. They have borne well, and have been fine, and paid well until this year. They did not pay at all this year, because they were not as good as usual, and the season was so late.

This letter sounds *so* true to nature, to those who have suffered, and is the same old story as told over an over again, by the good people of the Peninsula. Could they have had proper guides in fruit culture, such cases never could have occurred, and a knowledge of this fact has greatly stimulated me in preparing this book.

Chapter XVIII.

THE QUINCE.

I don't know of any large quince orchards on the Peninsula, but I do know that a great many trees have been planted, and that the results have not been satisfactory, and for this reason quince culture will be voted a failure by nearly every one who has attempted it. The whole, or a great part of the trouble, lies in the method of treatment. I have planted during the last thirteen years, probably, two hundred trees, but until recently, for lack of time and opportunity, have paid very little attention to them, and for this reason they have not been profitable to me, and since I have looked well into the matter, I see the reason and propose to remedy it, and to make my past experience of avail to the good of my fellow fruit-growers. My trees have been worked and treated, generally, like pear trees, and have thus lacked proper quince methods.

The quince is a small deciduous tree, almost shrub-like if left to nature. It is indigenous to the south of Europe, and was highly esteemed by the ancient Greeks

and Romans, both as food and medicine. The blossoms are large, beautiful white and pink, and appear late. The quince is not fit for food, raw, but for preserving, it is excellent, and is useful to give flavor and consistency to other preserves, and the seeds are much used for their mucilage in jellies, and as a demulcent in medicine. The two forms of apple quinces and pear quinces are the usual kinds. The apple is finer, but the pear is ready for market first. The Angers is, probably, the most useful variety, being so much used for grafting the pear to, and thus dwarfing it.

The quince is easily propagated from seed, or by laying it, or from cuttings. By cuttings is the proper way. Cut them in the Fall, heel them in and protect them through the Winter, and plant them in the Spring, where the sun won't be too strong on them. The quince can also be propagated by budding, and for this purpose use the Angers roots. Budding is the most certain way, probably, to perpetuate a variety.

The quince needs a good, rich, sandy loam, and if a stream is near it the better it thrives, or a pond, or any water. If for an orchard, plant twelve by twelve feet, or what is better, fifteen feet by ten feet. The quince is planted the same way as dwarf pears, and to grow them successfully, must be treated exactly as follows, or you will fail entirely, except the tree be near a smoke house,

or in some selected garden spot. These trees will grow with any treatment. I refer now to field culture.

The soil I say must be deep and rich, and thoroughly drained, with some sand in it. If near salt water, so much the better, and hence, I would recommend the field-culture of quinces in the southern part of the Peninsula near salt water. They must be mulched heavily every Fall, long coarse hay, salt hay, or straw or leaves will do. The fine roots run close to the ground and must be protected from the frost of our Winters. Tramp around them occasionally to drive out the mice during the cold weather, and especially near Spring. In the Spring, scatter the Autumn mulch around the tree as far as the branches extend, and give the tree a dressing of from three to five pounds of muriate of potash, the amount depending on the size of the tree, one year, and the next year a like amount of Kainit scattered around as far as the branches extend, and so alternating from year to year. Now as soon as the weather gets warm, fork over the ground to the depth of three inches only, with a common dung fork, re-mulch with salt hay, if you can get it ; if not, any straw, hay, or leaves will do. Two or three times during the summer, scatter salt over the mulch ; this keeps up moisture and the quince delights in salt. It will be seen we have not ploughed the ground. Well, the secret of success is, not to use the plough, as it disturbs the roots of the quince, they being so superficial.

Mulching and the forking over the ground is all that is needed. Every August, examine closely for the borer, and this will upturn the earth a little near the roots of the trees ; watch the borer or it will kill the tree. The quince sometimes blights, but probably only when near pears that have blighted. Treat it as for pear blight. Now an important point is to properly prune the quince. You must cut back the young growth in Winter or early Spring, one-half, and cut out all over-lapping and useless branches ; in fact train it more as a pear tree and not let it grow to a bush. In mulching, it will be seen I did not recommend green manures. Well, the reason is as I have so often before stated, I don't believe green manure ought to be put near any fruit tree until after it has been thoroughly composted, and I am a little afraid of its bacterial producing properties, even then. Now, as to the varieties of the quince to plant, it don't make so much difference what kind, provided, you follow the directions I have given for cultivation. There are the

Angers,
Champion,
Orange or Apple,
Pear,
Reas' Mammoth,
Meech's Prolific.

I can raise good Angers, or Orange, or Champion, or any other kind with right and proper treatment. The

Champion has shown the best fruit I have seen, and I have heard Meech's Prolific highly eulogized. With my present knowledge, if I was planting largely I would plant some of Angers, and largely of Orange and Champion, and especially Champion.

I hope Peninsula growers, and particularly those in the lower counties bordering on salt water, will take up the quince and test it freely, and I feel sure, if they follow the rules I have laid down, another success will be added to the realm of Peninsula fruit culture.

THE SPANISH CHESTNUT.

I find, often, when our Peninsula farmers wish to plant shade trees, and ornament their grounds, they select the maple, and various rapid growing deciduous trees and evergreens, all very handsome, and necessary, often, to get quick growth and shade; but, nevertheless, I think it unfortunate that more attention is not paid to the useful nut-bearing trees, and right here, I want to say that I urge this planting of nut-bearing trees among our good peninsula people, and particularly do I recommend the Spanish chestnut and the English walnut or Maderia nut, and, for the benefit of their children's children, the Shellbark, which is only an extra fine specimen of our common hickory nut, with favorable surroundings. These trees are all ornamental, and the

Chestnut and Walnut rapid growing, and thus desirable shade trees. I have no doubt they would all be decidedly profitable if cultivated with that end in view.

THE SPANISH CHESTNUT.

We can read the history of all large chestnuts in this country not derived from the native American sweet chestnut, in the name Spanish Chestnut. Yet all are not Spanish Chestnuts. There is the Downton from England, and the Lude from Scotland, and many other varieties, but when we speak of Spanish Chestnuts we mean all these large chestnuts, not native to this country. There is now one exception, the large, sweet, Japanese Chestnut, which nurserymen are introducing, and which, I hope, may prove even larger, sweeter and better than the Spanish, but it has not been thoroughly tested on this Peninsula as to hardiness, and I wont yet recommend it. The meat of all these nuts is excellent when cooked, and only inferior in flavor to our smaller, sweet native chestnut.

These large chestnuts are in great demand by confectioners, and from them they make the well known and delicious bon bon, Maron Glacé ; and here, let me tell you young men of the peninsula, these Marons Glacés are dearly loved by coy maidens. I have no doubt, extended production would develope many uses for these desirable nuts. Chestnuts are very easily

propagated. You may plant the seed in the Fall where you want the tree to grow. Put in one or two inches deep, and in the Spring it will sprout and grow. A good way is to take up a sod, drop the nut and return the sod, grass side down ; you may lay the nuts in a sandy bed in the Fall, let them get the action of the winter frost and in the Spring they will sprout. These had better be transplanted to nursery row, and planted a year or two old. You may also graft the Spanish Chestnut, on our sweet chestnut, but this is tedious. A good way is to take a seedling Spanish Chestnut, and then take scions from some good and well-known Spanish tree, bearing good nuts, and graft it. Thus you are more sure of getting good productive trees. I assure you those you buy from the average nurseryman are not always producers of the very best nuts. Selection and cultivation, and increased demand, will cause our peninsula nurserymen, intelligent and active men as they are, to remedy all this.

Now one secret about planting these trees. Whatever size when you plant them, cut them back at that time to two buds, and train your tree from the best one of these. If, after several years, a tree dont do well, cut it back to two buds and train over again. All chestnuts revel in such amputations, and I learned this secret of thus raising Spanish Chestnuts from John Landers the well-known Gardener and Horticulturist, who, with his

equally well-known sons, own and carry on the Rosedale Gardens on Landers Avenue, New Castle, Delaware.

As to the cultivation of Spanish Chestnuts, treat them just as I recommended the quince to be treated, by mulches, etc., and with little or no stirring of the ground, and watch them about the roots for worms. I formerly cultivated them like pears, and at the suggestion of one of my tenants, Mr. Charles S. Hill, I ceased cultivating them, and from that time they thrived splendidly, and now I have some magnificent and fruitful trees.

THE ENGLISH WALNUT OR MADEIRA NUT.

A delicious nut in great demand, and largely imported into this country, when we ought to raise all of them at home. I can recommend it from personal experience as entirely hardy on the Peninsula, as a very rapid grower, and as producing large crops, annually, of delicious nuts. It may be propagated by planting the seed where you wish the tree to grow, but decidedly the best plan is to sprout in the nursery, transplant to nursery row, and plant the tree, at from one to three years old. It grows right off and gives no trouble, and is to be treated like the Quince and Spanish Chestnut, except it does not require to be cut back. Its only fault I see is, that the wood is rapid growing and hence, brittle, and is more liable to injuries by wind-storms than surrounding trees. An avenue bordered by Spanish Chest-

nuts and English Walnuts would form a lovely approach to any of our bright and inviting Peninsula homes.

SHELLBARK.

This nut-bearing tree, by cultivation and care in reproduction, might be greatly improved, and although very slow-growing, should be planted in groves, about lawns and such places. They are a delicious nut, and to my taste are equal, if not superior, in flavor, to any other.

ENGLISH FILBERTS.

I have planted some of these. They grow slowly, and I should prefer the other nuts I have described.

These comprise about all the nuts and fancy trees I wish to speak of, or, at present, recommend; but on my Fruit Farm at Black's Station, Kent Co., Maryland, any one wishing to see a great variety of growing nuts and fruits, will be gladly welcomed by Mr. C. S. Hill, the intelligent manager of the farm.

THE DUTY OF PENINSULA FRUIT GROWERS TO ONE ANOTHER.

In the maxim "In union there is strength," there is much that concerns Peninsula Fruit Growers. They should stand together in all that pertains to an honest transaction of their business; they should stand together in obtaining such laws from the State, as shall

protect and foster their business, honestly spurning anything like legislation for the purpose of giving one single suspicion of advantage to them over any other citizen, be he high or be he low. The fruit grower needs no special legislation, for all laws that benefit him will be for the general good. In order to stand together, the intelligent growers of the whole Peninsula, if possible, (if not, let the Delaware Growers make the advance,) should establish a Horticultural Society, and let its one aim be the discussion of fruits, and the advancement of the interests of the fruit growers, and so the interests of all the good people dwelling within the jurisdiction of this Society. This meeting together of the leading men in the fruit-growing business, can only lead to good results, and the good effect will be apparent in better methods and better results, as witnessed in Massachusetts, Michigan, New Jersey, and many other States.

Let the Peninsula Fruit-growers gird on their armor, let them lead, not follow, and as Providence has so abundantly favored them, so let them be abundantly thankful, and so be doubly watchful and industrious.

THE DUTY OF THE STATE TO HER FRUIT INTERESTS.

As a mother fosters her children, so should the State foster those interests which bring health, wealth and happiness to her citizens, and without disparaging

any of the other great industries, what is of more importance to her people than this very fruit interest? That which has made us both fame and fortune, and which with cheery help and faithful watching, bids fair to render us as celebrated in song and story as ever was

"That delightful province of the sun,
The first of Persian lands he shines upon?"

Although what I have to say here applies to the whole Peninsula, yet I feel at liberty to more particularly address the citizens of my own State.

As I have said in the Preface to this book, one only has to enter upon work such as I have entered upon in the preparation of this volume, to see how little fostering care such a great interest as the fruit interest receives from the State. I say to you, men of Delaware, these great interests are threatened, and threatened more and more, as population increases and the cultivation of trees and plants is multiplied. Just as in the history of mankind, as he increases and multiplies, obeying the injunction of Holy Writ, zymotic disease appears. Every hamlet becomes a plague spot, and his very palaces, much more his hovels, become as sepulchres, and thus mock the proud assertions of his boasted civilization. And as with mankind, so with the fruits with which God has favored him; only crowd them, then pamper them, starve them, or treat them as you will, here again the zymotic enemy swoops down, and the

boasted beauty of Pomona yields to the cruel ravages of this relentless enemy.

So it must ever be, and as God has declared that man must earn his bread by the sweat of his brow, so to enjoy all the good things of earth He has given us, we must be watchful of them and labor for their protection. I believe it to be the duty of the State to act at once for her fruit interests now so seriously menaced by enemies on every hand. Look at France ; her industries and almost her very existence saved by the work of one man, the great and illustrious Pasteur. With a faithful wife and daughter, for five years did he diligently investigate the silk worm disease, and now from that study the origin of the trouble is traced to the moth with peculiar concentric rings. These moths are all destroyed now in silk culture, or rather their eggs are destroyed, and those eggs only are saved from moth, free from rings. These, hatching, form cocoons and the silk crop is assured. So again he has immortalized himself and rendered France unbounded service by his investigations into the fermentation of wine and destroying the germs by high temperature. So with the cattle and sheep pests has he wrestled and conquered, as well as with the diseases of the vines.

Given the opportunity, and the world will turn up Pasteurs as occasion will demand ; and now right on this Peninsula, we have the opportunity for just such a man. Here we have peach yellows, pear blight, the rust of

blackberries, the pear slug, the asparagus beetle ; in fact a thorn to every rose in our garden. We need a director of horticulture or fruit inspector, or by what ever title he be designated. He should be appointed by the State and paid a living salary, a good salary, with the understanding he is employed as a scientist and is to devote his time, yea, his very life, to the interests he is called upon to protect. We can't expect to get a Pasteur or a Koch, or a Leidy at the start, but the man should be a trained scientist and at the same time have some practical knowledge of his subject, or at least be an apt scholar at learning the practical parts.

His duty, in part, should be to investigate all fruit pests—all fruit tree diseases—and everything relating to the enemies of fruits, and his studies may be carried to the cereals, too. He should publish an annual report of his work, and give full statistics of all our fruits, and all matters pertaining to them. Give us such a man, capable to fill such an office, and his first report will be the greatest and most truthful advertisement the State ever received. Give us this man and our industries will be enriched by the protection and very salvation of the fruit interests, the greatest of all our industries. Give us this man, and I guarantee, for every penny the State pays for his services, we and our children, and our children's children, will get in return, thousands upon thousands of dollars, and the gratitude of thousands of

people yet unborn. Oh, men of Delaware, would that I were gifted with the eloquence of a Mirabeau or the persuasive oratory of a Choate, that I might burn these words into your very souls, and raise you willingly and quickly to action. Oh, study this question well, I beg of *you* who are to represent us in the coming legislature. Be up and doing. Let the living echoes of modern progress from far-off France be ever ringing in your ears. Let the voice of the great Pasteur encourage you. Our little State is small, in the past she has been conservative, we all know, perhaps, that was meet for her modesty, and for her good ; but now, men of Delaware, let us raise her from her dignified repose of centuries, let us teach her that her past conservatism carried beyond the just merits of her being, may be but the fore-runner of future disintegration. No, the Diamond State will take no step backward, she will advance in the front line of modern progress, and modern ideas ; and so let her carry her flag, and, overshadowed in body though she be, by States of larger degree, let us strive for her, let us encourage her, let us support her, and let us so form her record in the future, as it has ever been with her in the past ; that all may admiringly say, as she passes in review among the galaxy of States, stand up little Delaware, let us judge thee by thy soul.

THE END.

NOTE.—In planting all fruit trees it is well to familiarize yourself with the blossoms, and see that trees with any defect in the stamens, as where the stamens are dwarfed or absent, are planted near some variety having perfect blossoms. This is very important in apple culture, in peach culture, in pear culture, in fact, in the cultivation of all fruits; although in large orchard culture, with many varieties, failure, from the nature of the surroundings, don't often happen. In peaches, for example, as the Fox's Seedling has a better blossom than the Crawford's Late or Reeves, plant them near each other. In plums, the Wild Goose plum has an imperfect blossom and needs a plum with a perfect blossom near it to fertilize it, and so on. With these precautions I believe the weaker blossoms will be less likely to be injured by frost.—J. J. B.

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ERRATA.

Page 30, eighth line from bottom, insert the word "not" between the words "probably" and "been."

Page 226, ninth line from bottom, "Japanese" should be "Oriental."

Page 228, eleventh line from bottom, "Louis" should be "Louise."

Page 239, seventh line from bottom, "Clairgean" should be "Clairgeau."

Page 251, third line from top, the word "Eastern" should be "Easter."

Page 253, first line, "reduce" should be "elevate."

Page 260, last word of fifteenth line from top, "to," should be "from."

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